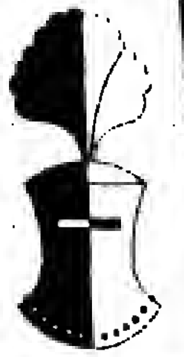

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NUMBER 86 THURSDAY, SEPTEMBER 14, 1978

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INTERNATIONAL BRIEFING

Munich clash with Sicob

AN unseemly row is brewing between the French and the Germans in the usually civilised arena of international exhibitions. Earlier this year, the German organisers of the Orgatecknic Cologne 78 office equipment exhibition, set for October 24-29, indicated their intention of usurping Sicob's position as the major autumn office equipment show. Now Sicob chairman Max Hermieu has another challenge to contend with: the biennial Systems show in Munich is to be brought forward from its usual mid-October date to clash directly with Sicob in September 1979.

● Sicob preview — page 35.

Scanner for Libya

LIBYA has become the first country in North Africa to order an EMI scanner. The Galaa Hospital in Benghazi is to have a CT1010 computerised head scanner, for use in diagnosis of head injuries after traffic accidents — a serious problem in Benghazi.

Imminent

JAPANESE manufacturer Fujitsu is about to start US manufacture of 50 Megabyte OEM disc drives for minicomputers at its Sunnyvale, California plant.

Univac addition

A NEW model in the Univac 1100 line aimed specifically at the large-scale scientific and engineering markets is reported to be under development at the company's Roseville, Minnesota facility.

Transpac shares

THE company set up to operate the French Transpac packet-switched network is capitalised at 20 million francs, and will be owned 67% by the state, 28% by a company called Utipac, owned by users of the network, and 5% by employees of Transpac and the French PTT. Due to begin service with 1,500 users at the end of the year, it is to grow to 25,000 by 1985.

Brazil network

THE Brazilian telecommunications company, Embratel, has accepted Nippon Electric's tender for a digital data communications network which included Siemens, Philips and ITT.

Swedish inquiry calls for improved Data Law

IMPROVEMENTS to Sweden's Data Law are proposed in the interim report of the governmental committee of inquiry into data legislation (DALK). But by and large the law passed in 1973 has proved a success, according to the report.

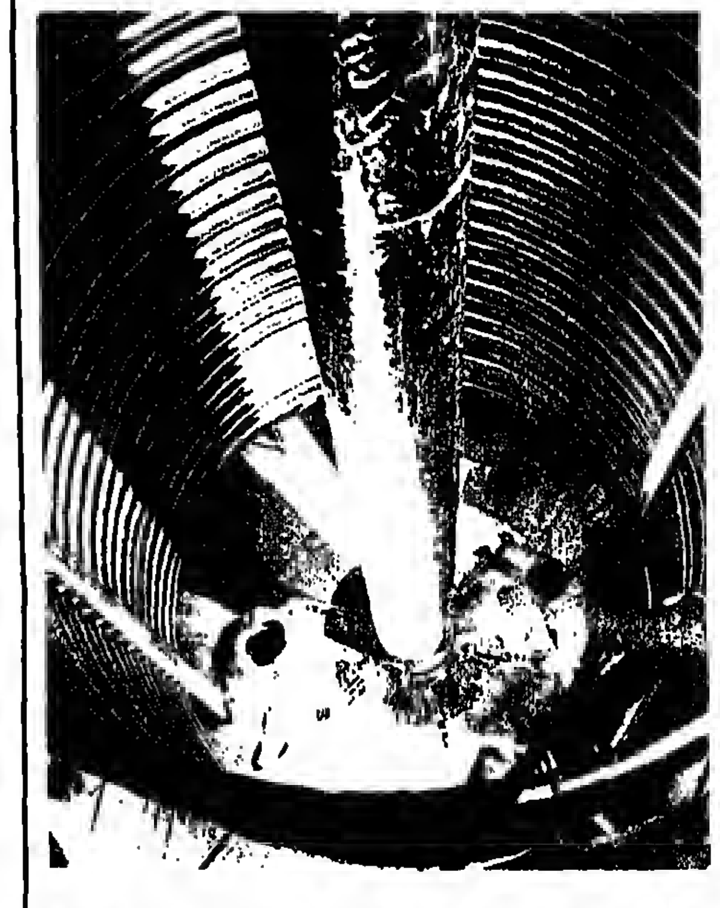
Among the recommended improvements are that "soft" data based on opinions and judgments should be handled with greater caution and that access to national registration and taxation data by commercial organisations should be circumscribed.

The pooling of information from databanks maintained by different State authorities, or the merging of State-held information with information from commercial databanks pose a significant threat to the privacy of the citizen, said the report.

The committee also urged a tightening up of the procedures whereby those wishing to maintain databanks of personal information are required by the Data Law to apply for permits. Sweden's data inspectorate should in future pay greater attention to the sources from which applicants would obtain data, to the manner of its collection, and to the purposes for which it was required.

In the long term the existing law, which curtails only computerised databanks, should be replaced by one designed to protect sensitive private data irrespective of the storage technique used. The report also recommends that in response to the rapid developments in data processing technology, an inventory of all sophisticated information-handling techniques should be drawn up.

The committee's report proposes that "non-sensitive" data should be made more easily accessible.



GA minicomputer automates production of penicillin

PRODUCTION of enzyme and penicillin products at its Delft production facility has been further automated by Gist Brocades N V with the installation of a second General Automation GA-16/440 minicomputer and a GA Remote Intelligent Multiplexer.

The installation is a 64K machine, the previous one having been 32K, and it will be used by the company's research and development department in the control and analysis of gas chromatograph tests. Later, it will be developed as a central laboratory system.

Gist Brocades has several fermentation units for penicillin production at Delft, each unit standing as high as a three-storey building.

As an individual batch of penicillin takes several days to complete, the tanks are operated in a phased sequence. The duplex GA-16/440 system has been installed to provide the best protection against equipment failure.

Operators monitor production via VDUs which provide a continuous check on control parameters and signal alarms in the event of failure. Reports are produced on teletypes on a daily and shift basis.

● Our picture shows one of Gist Brocades penicillin units at Delft which will be controlled by the General Automation system.

Tax boost for Japanese software

AS A boost to new software development in Japan, tax concessions are to be introduced for both manufacturers and users by MITI, the Japanese Ministry of International Trade and Industry.

Under the new rules, software shown in a company's books as an asset will be allowed to be depreciated at a much faster rate than hitherto.

It is understood that the main aim of this move is to help small software firms reduce development costs and support the large Japanese mainframe manufacturers to implement their software unbundling programme.

In other moves to help expand its computer industry, as part of long term plans for information technology in the 1980s, MITI is to strengthen the operation of the Japan Electronic Computer Co, which handles the leasing of all computers from the Japanese manufacturers.

JECC will now be allowed to offer a hire purchase contract as an alternative to its straight rental deal in order to combat the challenge posed by IBM's policy of making rental prices increasingly attractive.

MITI is also planning to push forward strongly with a plan to promote the Japanese development of the next range VLSI for the coming mainframe generation.

These steps represent a significant new development to the Japanese government's continuing plans to boost its information technology industry and are based on an "emergency measures" law.

Previous government plans had been aimed specifically at its computer hardware and microelectronics industry, whereas the latest measures emphasise the software and user angles.

The latest measures will take effect from the government's next fiscal year, which is the first one in which the "emergency measures" law is being translated into budgetary terms.

French plans take shape

THE French government's microelectronics plans are beginning to take shape, and two developments have just been announced. Rhone-Poulenc, the big chemical company, is to set up a 50-50 joint venture with the Atomic Energy Commission, to make the base materials needed for semiconductor manufacture.

The Commission has also formed a joint venture with Thomson-Called EFCIS; it will get 40 million francs of government support, and pay Motorola in the region of $10 million for technology. A third development, a new company called Secimos, in which Intel is likely to have a 20% stake, is still under discussion (CW, August 17).

ICL Australian head resigns

A REORGANISATION of ICLs Australian subsidiary, involving a split of the computer division into mainframes and small systems, has caused some dissent in the company, and the No 2 man in Australia, Wallace Weaving, who headed the computer division, has resigned.

Managing director Neil Lamming confirmed to Computer Weekly that a reorganisation was under way, but declined to give details, saying that it was not yet complete.

Meanwhile a major upgrade contract has been won by the company, which beat off fierce competition from IBM.

It is for a 2960, wanted by the Melbourne Harbour Trust to replace its ICL 1902T. Initially, the 2960 will use DME to run the existing monthly shipping berth optimisation, linear programming and structural engineering applications currently running on the 1900. These will be converted to run under VME/B, after which new applications, including cargo and services billing and trade statistics, will be developed using an IDMS database.

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Midas marketing in Japanese banks

JAPANESE marketing of the Midas banking system is to be handled by Toppan Moore Business Forms of Tokyo.

Developed by BIS Software of London, Midas, Modular International Dealing and Accounting System is designed to be used in the dealing rooms of international banks, and runs on IBM System 32 and System 34 small business computers.

"Toppan Moore is a joint venture between Toppan, the biggest printer in Japan, and Moore Business Forms of Canada," BIS managing director John Prosser told Computer Weekly. "It recently established a software subsidiary, and Midas is the first product to be taken up. It was a natural collaboration because Toppan Moore does 80 per cent of its business with banks."

BIS sees the link as a strong step, because some 20 of the biggest 60 banks in the world are Japanese, and typically make all decisions at *head office* in Tokyo about ... branches around the world.

"We chose System 32 for Midas because we wanted a machine ... developed software," he said.

Software compatibility with the attractive new terminal-oriented System 34 made it a particularly suitable choice.

BIS is developing a Swift interface on the IBM Series 1 minicomputer under contract with an unnamed customer for delivery in June next year. BIS already has an interface for the Chips New York interbank ... Series 1.

"Chips rules say you have to *have two processors,* and we will ... spare ..." commented Prosser. The lack of OEM discounts on Series 1 is apparently not a problem. "Our Series 1 solution is very competitive with the stand-alone Chips system announced by Burroughs on the small B80."

Apart from the new arrangement in Tokyo, Midas system is marketed out of London, New York and Hong Kong. In the medium term BIS is looking ... communications controller to interconnect the systems that it installs in the various foreign branches of ...

Wall Street pundits fear 'reversal' on computers

THE ongoing rally on Wall Street may be the last big rise before a sharp decline, according to one technical analyst. However, that pessimistic view is not held by all Wall Street's pundits these days, and some investment advisers have interpreted recent events as a sign that investor confidence is truly on the upswing, which could lead to a continued bull market.

The bearish view is that of Joseph C. Generalis, technical analyst at Oppenheimer, but its publication was preceded by a cautionary notice from the firm. Technical trend analysis is only one way to look at the market, and it can result in inaccurate predictions.

Nevertheless, the Generalis report is striking in its assuredness, and it is being read carefully by many serious investors, including many of the largest financial institutions in the States.

Generalis foresaw the rise in the market that went on through August but he feels that a major decline in stock prices will follow as a four-year cycle comes to an end. A four-to-six-week rise in stock prices could, he believes, lead to a levelling-off of market averages. Then, next spring, Generalis predicts there will be a steep drop in stock values, with the Dow Jones industrial average, currently around 900, falling below 650 and possibly as low as 550. Such a decline would not necessarily include all stocks, but few companies could expect their share values to withstand any severe erosion of investor confidence.

Gene Collins, of Evans & Co, on the other hand, believes that investors will experience a long-term growth in the value of their stocks. He believes that Wall Street's rising prices are due to institutions seeking "beyond the valley of short-term difficulty" to a general improvement in the fortunes of American business.

Computer industry stocks, including IBM, have risen dramatically during the past few weeks, and the expectation of those with confidence in the market is that the prices of these stocks will continue to climb. IBM, for example, will be shipping many new systems in the 303X range during 1979, and the sales will be reflected in increased earnings.

While some computer industry analysts, such as Oppenheimer's Gideon Gartner, have characterised IBM as "nearly recession-proof," recent history is by no means an infallible determinant of the financial prospects of the industry giant.

The key indicator to many investors will be the prime interest rates, those charged by banks to their customers. If the expected decline in interest rates does not materialise soon, inflation will worsen and an economic downturn in the US would most likely ensue.

Mainstream economic opinion is that inflation will level off, but some economists have little faith in the theories that have been used as a basis for the forecasts. Much depends on the attitude of OPEC and the hope that no world crises will test America's military or political strength.

NEWS FROM AMERICA BY HESH WIENER

AT&T's digital network seen as threat to the mini market

EVERYBODY who is anybody on the American computer scene has been guessing at the impact of AT&T's planned digital network, the Advanced Communications System (CW, July 27). But Howard Anderson, head of the Yankee Group, the US consultants has won the attention of big business — and it is expected he will soon earn the wrath of small computer makers.

Anderson, more than any other data processing pundit, is warning the minicomputer industry that ACS spells trouble for makers of small processors.

ACS, says Anderson, will "expand the market for dumb terminals while shrinking the market for intelligent terminals. It will expand the market for computers but will shrink the market for minicomputers, because it will use minicomputers internally."

The one beneficiary of ACS among the mini makers, according to Anderson, will be Digital Equipment. "Instead of selling to the end users, DEC will be selling to the Bell System which will then resell the computer power to the end user." ACS is expected to use the PDP-11/70 or the forthcoming 11/74 in its local processing stations.

This shift in an important market may hurt such lively competitors as Data General, now caught in a three-way squeeze.

The pressures on Data General, typical of those on other minicomputer makers, come from IBM, which increasingly adds utility to its Series 1 systems through the release of software packages, microcomputer makers, including the semiconductor houses, which have taken over large segments of the low-end processor market; and manufacturers of dedicated small business systems, which offer turnkey applications systems (Basic Four, for example) or greatly simplified programming (Logical Machine).

Hewlett-Packard will be vulnerable as well, because its computer group invested thousands of dollars in the development of networking software, sent out high-priced management consultants to promote its products as complementary to those of IBM, and put a series of intelligent terminals on the market based on current and future silicon-on-sapphire technology that cost a lot to develop. ACS could render much of the communications work at H-P obsolete or unsaleable.

Hewlett-Packard, like many users, was led to its commitment by a belief among its managers that IBM will set the pace during the 1980s. With ACS most likely on the way, there will in fact be two choices for users with communications needs.

While IBM and AT&T battle for customers, those companies that have staked their future on selling private networks to America's industrial giants will be left to fight over the tiny bits of territory the giants overlook.

The Yankee Group, believes that 62 per cent of the top 500 industrial companies are thinking about implementing an intelligent network. Anderson feels these organisations have three choices — IBM, AT&T, or a do-it-yourself approach.

The idea of assembling a network from independents' components "doesn't make sense anymore, and maybe it never did," says Anderson.

Nevertheless, business has not held off on building networks to meet its immediate needs. There are 2,500 private networks in the US today. With ACS, Anderson believes there will be 7,500 such facilities by 1985.

HOWARD ANDERSON, head of the Yankee Group, says the advent of AT&T's ACS will be a threat to small computer makers..

AT&T will devote enormous resources to marketing ACS. The company's future, he says, is "inextricably linked" to ACS. This is because the backbone of AT&T's business is presently its Long Lines division, which provides inter-city trunks. Long Lines, without ACS among its offerings, may well succumb to competition from Satellite Business Systems and the host of microwave services.

The Yankee Group's in-depth report on ACS is available for $800 from the company at Post Office Box 43, Harvard Square Station, Cambridge, Massachusetts 02138.

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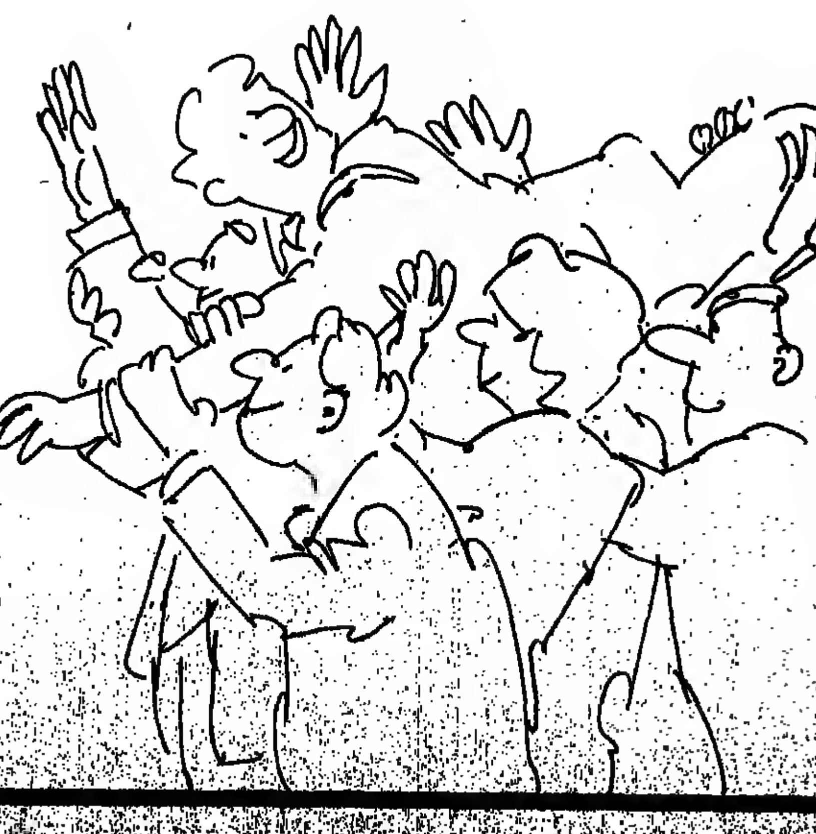


Government abandons magnetic passports

THE US government, which has been seeking an advanced way to control the use of passports, has abandoned earlier plans that included the issue of magnetic cards to passport holders, and according to some sources, all other citizens as well.

The current scheme to update manually-handled passports, according to *Privacy Journal*, involves the use of optically-read cards that could also be interpreted by humans, including the bearers of the identification documents.

The change was reported to stem from new people in the Department of State's Passport Office. Frances Knight, who had run that office for years, and who advocated the use of identity cards by all citizens, has been replaced by Loren E. Lawrence, characterised by *Privacy Journal* as a career diplomat.

One reason for abandoning the magnetic card idea, according to the Washington periodical, is the ease with which passports could be shared without the knowledge of the bearer. The other key issue was the way the public would react.

Privacy Journal quotes Lawrence as saying, "The public would not stand for any data encoded on the passport unless it could all be read by the citizen himself." Other nations are believed to agree with Loren's conclusion.

In an unrelated story, *Privacy Journal* notes that the National Centre for Health Statistics is developing a national death index on computer, reportedly to aid medical researchers. The index will contain names, maiden names, social security numbers and information about the demise of the individual. The system is due to start in January.

Privacy Journal is a monthly published by Robert Ellis Smith, a US commentator on privacy issues. It is available for $45 a year in the US, $60 overseas from Post Office Box 8844, Washington, DC 20003.

Social Security files are 'not safe'

WASHINGTON REPORT BY CAMERON DAVIS

THE US Social Security Administration's financial and medical data files on millions of Americans "are not properly safeguarded from potential loss, destruction, abuse or misuse." That was the sobering message delivered by the US General Accounting Office in a report just made public.

In the fiscal year 1977, GAO states, the SSA's massive data processing system serviced over 33 million beneficiaries sharing some $103,000 million annually. "With the vast number of records, and the number of offices involved in the SSA operations, safeguards must be present to prevent unauthorised alterations, destruction, abuse, or misuse of beneficiary records — a valuable national resource," the audit agency asserts.

According to GAO, the investigation of SSA's computer and telecommunications operations was prompted in part by reports to some Congressmen that SSA employees manipulate the files for personal profit. On one instance, GAO says, a "private company built a flourishing business by gaining unauthorised access to federal medical records and selling the information to many of the nation's largest insurance companies."

The Accounting Office also cites several system design and management problems at SSA which have led to "security weaknesses". They include the ability to create as well as query beneficiary files from most terminals, failure to use audit trail features within the system; failure always to lock terminals during non-working hours; and unlimited and unrestricted access to terminals.

Also, GAO points out, hard copy beneficiary records are vulnerable to potential abuse and/or misuse and destruction in most field offices because of problems associated with the way claimant files are stored; the readily available use of microfiche files and photocopy equipment; weaknesses in securing field offices after working hours; inadequate fire protection; the way sensitive documents are disposed; safeguarding beneficiary data; and security background checks of employees.

GAO points out, however, that during the course of its review, SSA has taken some precautions that could lead to an "active" security program.

Acting SSA Commissioner Don Wortman commented, "We have already taken steps to ensure that personal information in our computer system is made more secure." He pledged that further security measures are on the way.

Concern at decline in research

DUE to growing concern over the decline in innovative research and development by American industry, President Carter has created an inter-agency committee to review issues and problems related to industrial innovation. Chairing the newly-formed committee is Juanita M. Kreps, Secretary of Commerce.

According to Kreps, the number of patents granted to US citizens declined 21 per cent between 1971 and 1976. During the same period, she points out, patents to foreign residents grew 16 per cent. She adds that by 1976, 37 per cent of all US patents were going to foreigners.

"Our share of world manufacturing exports simultaneously has been shrinking, with noticeable effect on our balance of trade," says Kreps. "Some countries now appear to be beating us at our own game: developing and exporting innovative technology."

The committee is charged with examining the impact on innovation of federal economic policy, regulatory policy and foreign relations. The group is expected to report its findings within 14 months.

Other members of the committee are the White House Science Adviser; the Secretaries of the Departments of Energy, Defence, Treasury and Health, Education and Welfare; the Attorney General; the administrators of the Environmental Protection Agency and the National Aeronautics and Space Administration; the directors of the National Science Foundation and the Office of Management and Budget; the Chairman of the Council of Economic Advisers; the Assistant to the President for National Security Affairs; and the Special Representative for Trade Negotiations.

JUANITA KREPS ... "Some countries beating us at our own game."

DP has vital role in national security

THERE are times when the best is not good enough. Although the US Department of Defence is recognised as the government-wide leader in the management and use of computers, it evidences "many areas of serious concern" that deserve immediate attention for national security.

That was the conclusion reached by one of 10 task force teams involved in the US government's Federal Data Processing Reorganisation Project.

"The role of computers in the area of national security is a vital one and is not receiving attention commensurate with this importance," said the national security taskforce. "In a future conflict, intelligent computer management could have a major impact on the success of the national effort and would extend beyond purely military areas."

Another major problem cited by the DP reorganisation taskforce is that the clear identification of computer technology as a career speciality has been treated differently by Army, Navy and Air Force units.

"Since none of the three services deals with the matter comprehensively, a great many competent personnel have been lost at the periods in their career when productivity and value is at its peak," the team reported. "This is a tremendous economic loss to the nation."

The defence study group also criticised DoD for not knowing the total dollar value of its DP resources, as well as for failing to manage centrally this "significant" resource. It also said that within the defence services there is no standard pattern of organisational authority or policy regarding DP management.

Further, the study team found, DoD's acquisition of computers is dealt with in a different manner depending on whether they are for administrative use or for use within weapons or intelligence systems. "This has led to a high degree of frustration and a resultant waste of considerable manpower," the team claimed.

Looking at the individual defence agencies, the study team found that the Air Force has yet to recognise that the influence of DP on its mission is all-encompassing. Often, it said, the DP resources are managed on a part-time basis by someone with other responsibilities as well. This has led to a deterioration both in the status and recognition of the DP career patterns, and as a result many valuable personnel have been lost.

As for the Army, the task force reported that the absence of strong, cohesive management of all automation/telecommunications has led to a fragmentation of efforts in this area which could, if left unchecked, severely inhibit the Army's ability to enhance its readiness by the use of automated systems.

Government offers users a network measurement system

RESEARCHERS at the US National Bureau of Standards have developed a Network Measurement System to help users evaluate the quality of computer services delivered through computer networks. The NMS measures the service delivered to the user rather than the internal operating efficiency of the system.

"All a computer network user really wants to know is 'What's in it for me'," explains an NBS spokesman. "He isn't terribly concerned with the throughput of the entire system."

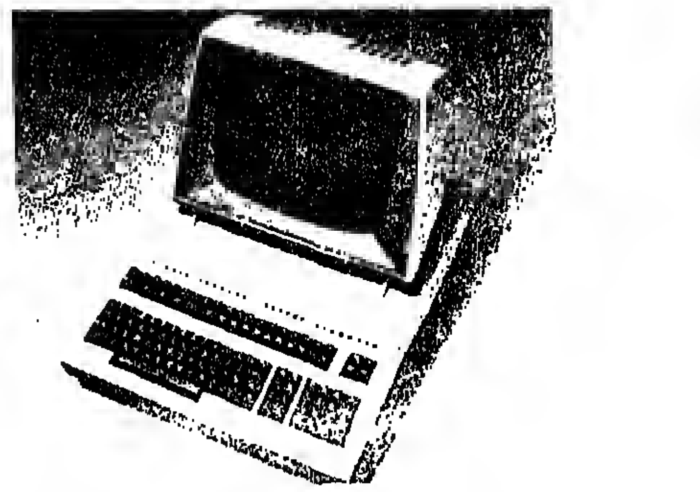
With NMS, he says, users can determine the level of service being provided, decide on needed improvements, and evaluate the effects of changes made.

The NMS consists of a data acquisition device called the Network Measurement Machine and a Data Analysis Package that provides information about the quality of network service delivered to interactive terminal users, as well as the nature of user demand and network utilisation.

The system measures network performance in terms of such quantifiable elements as response time (the elapsed time from the last keystroke made by the system is displayed at the user's terminal) and interactive turnround time (the elapsed time from the beginning to the end of a specified job or function).

The NMS is implemented on a minicomputer employing regular and special purpose hardware controlled by a specially-written software system. The regular hardware includes the processor, an operator's console, disc and magnetic tape storage, two programmable clocks, and data communications interfaces.

Special purpose hardware is used to connect the NMS to the network to be measured. It includes an automatic calling unit and line selector for computer-controlled origination and answering of data calls, and a specially designed communications line interconnection device called a "data probe."



ADM-31 WITH TWO PAGES OF DISPLAY

The ADM31 is a low-cost high reliability desk top CRT with full editing, formatting and two pages of display. So the ADM31 has twice the display potential with many of the attributes of terminals costing twice as much.

The ADM31 is completely self contained, with a keyboard, control logic, character generator, refresh memory, and interface. What's more, it incorporates a microprocessor which augments its reliability while making it even easier to use. Block transmission and protected fields are standard, with a printer port option.

The ADM31's amazing 90 key keyboard is integrated with the main logic, and is capable of generating all 128 ASCII characters (upper and lower case, numerics, punctuation, and control). It features an integral numeric pad, with period, comma, tab, minus, and numerals arranged in calculator format.

The ADM31's editing capabilities let you clear the screen, or use a destructive cursor for a character change. Read and load cursor permits sensing of the current address, and direct, absolute addressing to any X–Y coordinate. The controls let you skip protected fields, backspace, forespace, move up, down, return, home, and new line. And you can store Control Characters which are displayed as unique symbols.

The ADM31 comes with character insert/delete, line insert/delete, erase to end of line/field/screen, back tab, can clear to protected spaces, clear to unprotected nulls and set and reset copyprint.

ADM-42 ALL BUT THINKS FOR ITSELF

The ADM42 is a semi-intelligent terminal that gives the user flexibility of format, security, editing, interface, and transmission. Like the ADM31 it features a full two page display, but it also has an optional extended memory capable of adding data space in 2 page increments up to a maximum of 8 pages.

The terminal boasts a bright, easy-to-read, 2000 character display, a full 128 ASCII character set, 16 function keys for 32 separate commands, and five separate cursor control keys, plus an optional Programmable Function Key feature that lets you define the function keys. An alternate character generator giving an additional 128 characters and a line drawing set is also available.

The ADM42 displays on screen a wide range of information at a glance, and special symbols indicate the entry of all control characters in memory. The ADM42's Field Protect Mode also allows rapid data entry into forms or instruction pages. The ADM42's displayed data is formatted in 24 lines of 80 characters and it has an 80 character 25th line; for status indicators, or special messages.

Screen attributes of the ADM42 include Field Blinking/Underline; Field Blanking and Reverse Video which you, or the computer, can designate for use on areas of the display.

And as a bonus to existing ADM2 users the ADM42 is upward compatible. So when you upgrade to the ADM42 you don't worry about rewriting your software. Just plug the ADM42 into the system you've been using all along.

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AT&T's submission of its proposed Advanced Communications System (ACS) to the US Federal Communications Commission for approval has once more focused attention on public data networks on both sides of the Atlantic. France was the first European country to offer specialised data networks of all types — circuit switched, packet switched, and leased channel, and the French PTT is the leading advocate of packet switched networks, against the opposition of the West German Post Office, which advocates circuit switched networks.

The debate between the advocates of circuit switched and packet switched systems has hitherto obscured a much more important question. Is the separation of data from voice traffic a good idea on any but the shortest time scale with the minimum of investment? Will the sums now being invested in public networks help or hinder the development of data communications in the 1980s, and the widely predicted integration of telecommunications with data processing and office automation?

In this MARKETVIEW, Fred Lamond discusses the technological and economic background to the networks that already operate in France, West Germany and the UK, and the arguments for and against their further development in the next few years.

Solving the dilemma of public networks

By Fred Lamond

A DATA network is a specialised telecommunications system restricted to digital data exchanged between computer terminals, processors, and perhaps even facsimile receivers and transmitters, but excluding voice and TV.

It is characterised either by separate circuits from those of the normal telephone network, or by separate trunk circuits, or by both, and may have its own switching exchanges if it is a switched network.

Public data networks are those provided by the PTTs themselves, on which they provide either circuit switching or packet switching exchanges to link any user to any other. In addition, the French and West German PTTs have given network names to some of the leased channel facilities that they provide to users for their private networks. Table 1 gives a list of public data networks offered in Europe and the line speeds that they offer.

In circuit switched data networks, PTT switching exchanges establish a temporary circuit connection of given throughput speed between two computers and/or terminals connected to the network at any point. All error checking and correction and other handshaking procedures are left to end-to-end protocols implemented on the computers and terminals that users connect to these networks.

The time and distance dependent call charges make it no more expensive to implement an SNA-type hierarchical polling system on a circuit switched data network than a distributed network architecture like Decnet.

West Germany opened the 200 bps Datex network in 1967 for teleprinter-to-computer communications, and France followed suit by boosting its Telex network to 200 bps in 1969.

In 1973, France opened the switched Caducee network for full-duplex 2,400, 4,800 and 9,600 bps communications, with additional 48K, 64K and 72K bps switched facilities within the Greater Paris area. West Germany opened a 2,400 bps Datex service in 1976, and 300, 4,800 and 9,600 bps Datex services in 1978.

Telex lines and the original 200 bps West German Datex lines are digital and separate from the telephone network only as far as the nearest telex exchange. There they are modulated into analogue waves by PTT modems and frequency division multiplexed on the same 48 KHz, 240 KHz and 2 MHz carrier channels as voice telephone lines.

The Caducee network shares the telephone network's FDM analogue carrier channels between its 14 access points and concentrators and the single switching centre in Paris. The subscriber end circuits are analogue, but the Paris switching exchange is digital. It can therefore accept digital switching signals from connected computers and terminals at 2,400 bps, and thus establish circuit switched connections in under 1 second.

It was for the sake of the fast digital switching of temporary circuit connections that the West German Federal Post Office developed the separate Electronic Data System digital data network in 1976. This is a high level trunk network of wideband PCM carriers connecting a single national switching centre in Mannheim with 17 other regional concentrators and access points, Figure 1.

Unlike Caducee, the German EDS uses PCM digital carriers between its regional concentrators and Mannheim with time division multiplexing. This enables the Siemens EDX control computer at Mannheim to allocate available trunk capacity variably in the light of traffic demand.

EDS carries also the trunk portion of the Direktrufnetz leased channels and allocates the required trunk capacity to any permanent leased circuit only when this becomes active.

By its very nature, circuit switching cannot recuperate that part of a temporary circuit's throughput capacity that the two connected computers or terminals do not use.

It is in order to eliminate this wastage trunk channel capacity that the French PTT and British Post Office have pioneered their experimental RCP and EPSS packet switching data networks, and are planning to replace them in 1979 by Transpac in France and, perhaps the NPSS or PSS networks in the UK, that will conform to the new CCITT X25 norm.

Transpac will link at its inception 12 nodal switching exchanges and 13 other access points and concentrators throughout France. British plans for NPSS are more modest and provide for only three switching exchanges in London, Birmingham and Manchester with access points and concentrators in six other cities.

In packet switching networks, no trunk channel capacity is ever wasted as long as there is any data traffic from anywhere to take advantage of it. Trunk links between nodal exchanges or concentrators are used to transport at a uniform speed standard "packets" of up to 1,024 information bits from any of the up to 4,096 "logical channels".

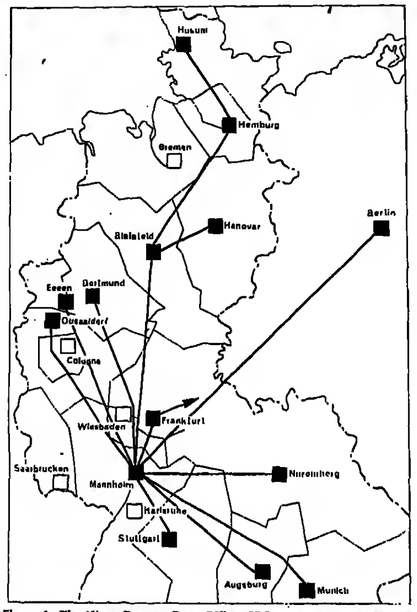


Figure 1: The West German Post Office EDS network as it stood in mid-1979. The black squares show the concentrators in use in July, 1977; the white squares show the concentrators that are due to be in operation by 1980. Links to foreign networks are made via the Frankfurt exchange.

As each packet contains its own logical channel number in its "envelope", packets from different logical channels can be interleaved on each trunk link between two nodes in any sequence as they arrive at the dispatching node.

This economy of trunk capacity usage is also reflected in the charges. While these contain a moderate connection fee, the main component will be for the transmission of each "packet" irrespective of the distance over which it travels.

However, this greater efficiency of trunk channel usage involves considerable additional overheads for hardware and software for both the common carrier and the network users. At each state in the transmission path handshaking, error checking and correction procedures have to be carried out afresh and in each package some of the 1,024 bits would have to be allocated to these protocols.

The French PTT and other X25 supporters claim that public network intervention in the definition and implementation of data link protocols will impose a measure of standardisation on computer-terminal data communications, and thus open up the market to any manufacturer's terminals to exchange data with any manufacturer's host computers.

This is a somewhat doubtful claim. There is nothing in X25 to prevent IBM or any other computer manufacturer from incorporating secret software keys in the information bit streams that their terminals send, and allowing only information bit streams that incorporate these keys to access certain proprietary systems or applications software on the host computers.

It is not because X25 could be effective in opening the market to greater competition that IBM criticises it so strongly. It is because the volume dependent charging method, based on numbers of packets transmitted adopted by PTTs for packet switching networks penalises hierarchical polling user network architectures, like SNA, and favours distributed contention network architectures like Decnet.

The implementation of X25 compatible protocol interfaces will also involve all computer and terminal manufacturers in additional hardware and software costs, that will inevitably be passed on to the users in the form of higher prices.

The only exceptions will be teleprinter and TTY-compatible display terminals with transfer rates of 300 bps or less.

Computer and terminal manufacturers and their users will not be alone in facing increased costs on packet switching networks. The PTTs' own investment in nodal switching mid-computers and their software to run a network like Transpac is considerable.

Is this a proper channel for investment of scarce public funds by state-owned monopoly common carriers? Could the same funds, if invested in additional microwave carriers or a communications satellite, not have provided far more additional trunk capacity for voice as well as data traffic, than the wasted capacity that packet switching recuperates? And how are the PTTs going to cover their network operating costs and amortise their capital investment?

The current base of computers and terminals connected to PTT telecommunications networks is narrow. A mere 47,600 in France at the end of 1976, 48,000 in the UK in March, 1977, compared with 21,770,063 telephone connections in the UK at the same date.

Moreover, a large number of the terminals connected to the telephone or telex networks at present access computers within a short distance, and are thus not potential customers for the essentially long distance packet switching networks. Those that are used for long distance data communications by the banks, insurance companies and airlines are connected to private leased line networks that are already in place and that their users would be reluctant to discard.

It is admittedly not so much with current as with future data communications traffic in mind that many PTT administrations are implementing data networks. The Eurodata study has estimated that the number of computers and terminals connected to public telecommunications networks will double between 1976 and 1980, and more than double by 1985.

However, most of this growth will be accounted for by the current private network users, such as banks and airlines, which will want to add additional terminals to their existing networks. How will the PTTs persuade them to use the new circuit or packet switched systems?

The charges on these can be made much lower than for equivalent traffic on leased lines, which is what the US and Canadian privately owned value added common carriers are doing in the competitive environment in which they find themselves. But in those cases the available data traffic will not cover the investment before 1985, if then. And PTTs will find themselves effectively subsidising commercial data traffic out of public funds. Is that sensible?

If on the other hand, the PTTs fix packet switching tariffs at levels to recoupe costs by 1980, then they will get few users, because the largest users will find it more economical to retain their private leased line networks.

The only way in which the PTTs can recover their investments is by adopting the policy of charging high prices for the use of both circuit and packet switched data networks, and even higher prices for the use of alternative data communications facilities. That is why they effectively doubled their charges to the banks for the use of their private multi-user Swift network at the beginning of 1977.

It was to make its high Datex charges artificially attractive that the West German PTT has maintained a monopoly on modems connected to the switched public telephone network, and is charging as much for them in monthly rental as it would cost to buy them on the open market.

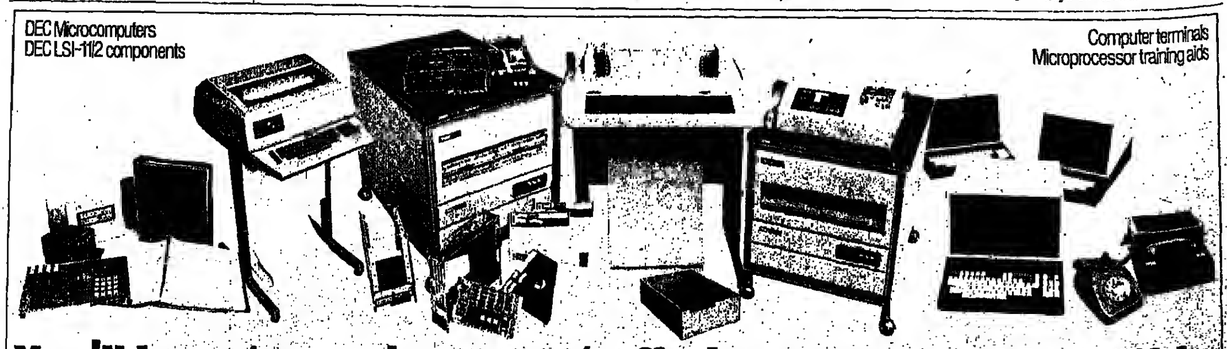
The end result could be that the already very expensive European data communications facilities (compared with the US and Canada) will become even more costly at a time when the manufacturing and installation cost of both trunk channel capacity (via microwave and satellites) and electronic

● Turn to page 32

Owing to a typographical error the final sentence of the last Marketview (CWI, July 13) was incorrect. The point being dealt with was the relational database system that is likely to be introduced with IBM's new H series. It is expected that this will not be available retrospectively on 370 and 303X processors and Marketview's final comment should have read: "Amdahl, Itel and other compatible processor users would be no worse off."

Network	Countries	Opened	Transmission Speeds (bits/second) Asynchronous	Synchronous	Type of line	Subscriber End Circuits	Trunks	Switching	Access points	Switching exchanges
A. Circuit-Switched Networks										
Telex	All Europe	1950s	50	—	FD	Digital	Analogue	Analogue	Anywhere	Many
	France	1969	75, 100, 134.5	—	FD	Digital	Analogue	Analogue	Anywhere	Many
			150, 200							
Datex 200	West Germany	1967	Up to 200	—	FD	Digital	Analogue	Analogue	Anywhere	Many
Cnducee	France	1973	—	2,400, 4,800, 9,900	FD	Analogue	Analogue	Digital	15	1
	Paris area	1973	—	48K, 64K, 72K	FD	Digital	Digital	Digital	1	1
Datex (EDS)	West	1978	—	2,400,	FD	Digital	Digital	Digital	14	1
	Germany	1979	Up to 300	4,800, 9,600	FD					
Nordic	Denmark, Norway, Sweden, Finland	1979	Up to 300	2,400, 4,800	FD	Analogue or Digital	Digital	Digital	4	4
B. Packet-Switched Networks										
RCP	France	1975	—	2,400, 4,800, 9,600	FD	Analogue	Digital	Digital	10	4
EPSS	UK	1979	Up to 300	600/1,200, 2,400, 4,800	FD	Analogue	Digital	Digital	3	3
IPSS	UK-USA traffic	1978	Up to 300, 1,200	1,200, 2,400, 4,900, 9,600	FD	Analogue	Digital	Digital	1	1
Transpac	France	1979	Up to 300	600, 1,200, 2,400, 4,900, 9,600, 18.2K, 48K	FD	Analogue or Digital	Digital	Digital	25	12
Euronet	Nine EEC countries	1979	Up to 300	900, 1,200, 2,400, 4,900, 9,600	HD or FD	Analogue or Digital	Digital	Digital	8	4
NPSS or PSS	UK	1979?	Up to 300	800, 1,200, 2,400, 4,900, 9,900	HD or FD	Analogue or Digital	Digital	Digital	9	3
C. Leased Channel Networks										
Direktrufnetz	West Germany	1973	50, 200, 300, 1200	2,400, 4,800, 9,600 or 48K	HD or FD or S	Analogue or Digital	Analogue or Digital	Digital	Anywhere	1
Transpac	France	1973	50, 75, 110, 150, 200, 300, 900 or 1,200 for terminals	4,900 for host computers	FD	Analogue or Digital	Analogue or Digital	—	23	—
Transmic	Paris	1979	—	2,400, 4,800, 9,900, 19.2K, 48K, 64K, 72K, 240K, 2M	FD	Digital	Digital	—	—	—
	Paris of France	1979								

Table 1: Public data networks offered by European PTTs in 1979 or due to open in 1979. FD = Full-duplex, HD = Half-duplex, S = Simplex.



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KEITH JONES REPORTS FROM BUDAPEST

Hungary keeps up with the latest banking techniques

Joseph Keller (right) director of computing services at OTP in Budapest describes to Keith Jones the layout of the repayment document used by the bank's loan account holders. They are standing next to the Cummins-Allison OCR system installed at OTP earlier this year which can read 40,000 of the documents an hour.

AS one of Eastern Europe's healthiest and best managed economies, Hungary is very much a consumer oriented society these days. Its state-owned manufacturing enterprises take note of what people want and promote their wares through advertising, while house and flat purchasing is not only allowed but actively encouraged through long term low interest loans.

When people in Hungary want a loan to buy a house or flat, of if they need short term credit for a television, washing machine or some other consumer durable, they go to the National Savings Bank, OTP, an organisation that is adopting the most up-to-date data processing techniques to cope with its steadily increasing volume of business.

OTP's data processing operations are centred on a Siemens 4004 Model 45 mainframe installed in 1973 and one of the biggest applications run on the system these days is managing the two-and-a-half million OTP loans outstanding at any one time.

The method of repaying a loan is fairly simple, involving fixed amounts paid in each month at any of the 3,000 or so Post Offices or 748 OTP branches located around the country.

But the data capture workload created by the hundreds of thousands of payment documents received each week at OTP headquarters in Budapest has persuaded the bank to change from punch card and paper tape to OCR as the principal input technique.

According to Joseph Keller, director of computing services at OTP, the problem faced by the bank is increasing data entry volumes coupled with a serious shortage of key punch operators. This is the result of zero unemployment in Hungary, most women already having jobs.

OCR is an area of data processing technology not being developed seriously in the Comecon countries at the moment, so it made sense for OTP to look at the various systems manufactured in the West, with the US obviously the main source.

The system chosen was a Cummins-Allison 5400 mixed media configuration with 16 keystations for reject re-entry, and for non-OCR data capture as well as a high-speed OCR document reader. It was supplied to OTP by the Cummins-Allison European distributor, Scandata, a firm which already has two other Hungarian customers, the Central Statistical Office, KSH, and the Ministry of Building Works.

The deal negotiated by Scandata and Metrimpex, the Hungarian trading organisation for computers and electronic equipment.

The application is ideal for OCR. The monthly payment documents are printed by the Siemen's mainframe at OTP and each has a single line of OCR B numeric characters incorporating the account number of the loan, the monthly amount, a check digit, two digits that indicate the district the customer lives in, and one digit that signifies if the loan is short or long term.

Batches of 12 documents cover payments for one year are printed and mailed to account holders, and those documents that are used to make payments at Post Offices come back to OTP via the Post Office headquarters in Budapest which submits them in batches of 2 Each batch is delivered to OTP along with a tally roll listing the amounts on all the documents and a batch total.

According to Keller, if there is any disagreement between the tally roll total and the total generated by the OCR system OTP, the Post Office accepts OTP's figure and pays it, accepting that the OCR system is more accurate than its tally roll operators.

Being controlled by a General Automation SPC 16 minicomputer with a 128K main memory and 10 Megabytes on disc, the Cummins-Allison system can do a lot more than batch total and has been programmed in RPG II to carry out disc sorts account type and district.

The system processes a number of other smaller volume document types, and OTP plans to add a page reader to the configuration for capturing interbook-keeping data.

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Why the Post Office should drop NPSS

● From page 31

switching exchanges is dropping rapidly.

These rising costs may well stifle the growth in European data communications, and allow the US to retain its present dominant position in the growing world market for public and professional computerised information databases.

This is a pity, because technical developments like viewdata and the new breed of integrated voice/data service terminals such as the Nixdorf 8811 Datatel have the potential of creating an explosion in the demand for digital data communications facilities in the 1980s.

To be used by domestic and small business users, however, both viewdata and integrated voice/data service terminals will require an integrated voice/data telecommunications network to support them. This need not necessarily be the old analogue telephone network with its unsophisticated electro-mechanical switching exchanges and slow analogue switching signals.

Both the new circuit switched data networks, like Datex/EDS and the Nordic Public Data Network, and the alternative packet switching networks such as Transpac, Euronet and NPSS, thus look like expensive white elephants irrelevant to the needs of 1980s domestic viewdata and automated office users.

Of the two, circuit switched data networks seem preferred as they could be converted comparatively easily into integrated voice/data overlay networks, whereas packet switching networks are totally unsuitable for voice traffic because of an average 0.5 to 1 second transmission delay to packets through the network.

No wonder the British Post Office is still hesitating over whether to go ahead with its X25 compatible NPSS packet switching network to succeed EPSS in 1979, even though NPSS plans are much more ambitious than the French PTT's Transpac.

If the Post Office should decide finally not to implement NPSS at all, they should be congratulated for far-sightedness and thanked by data communications users for relieving them with unnecessary additional costs.

Telex switch

NORWAY'S telex traffic is being switched by a £2.2 million system of 20 computer-controlled telex exchanges from L. M. Ericsson of Sweden. The switch will be installed in Oslo and provide several new telex facilities, including abbreviated dialling, alternative routeing and broadcast.

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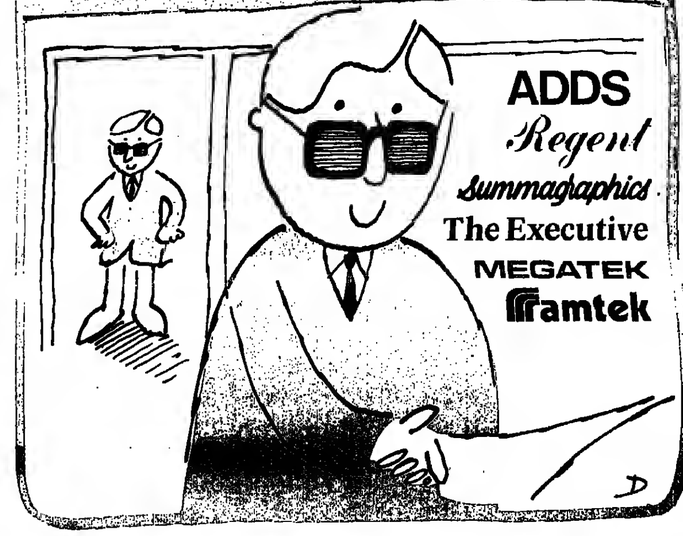

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alifornia dates P power

a massive upgrade of its puting power, the California te Justice Department is nding $33 million with Uni- to replace its six ageing RCA ectra 70 mainframes. The ntract involves two 1100/81s, ee 90/80s and over 2,000 ter- nala, and the equipment is ing leased for eight years.

The terminals are to be instal- d in over 500 law enforcement ency offices at Federal, State, egional and County levels, and ill give officers instant access o criminal record files.

The contract will be wel- comed by Univac, which oc- quired the installed base of RCA computers when it pulled out of the computer business some seven years ago. The Spectra 70 was built under licence in the UK as the English Electric (now ICL) System 4.

Middle East order

A LARGE contract in the Middle East has been won by Plessey Communications and Data Systams, of Beeston, Nottingham. Private manual awitchboards and telephones worth £375,000 have been ordered by the Jordan Telecommunications Corp.

HAMBURG CONFERENCE ON ARTIFICIAL INTELLIGENCE

Less glamour, more science now

Ovar 175 reaearchars from 15 countrias met in Hamburg racently to report recent work in Artificial Intelligence (AI), the analysis of human mental faculties by computational mathods. The conferance was sponaored by the Society of Artificial Intelligenca end Simulation of Behaviour, an international organiaation besed in Briteln, and the Gesellschaft fur Informatik, the Garmen computer science orgsnlsatlon. One of the partipicents, Dr DREW McDERMOTT of Yale Univeraity, reports.

ARTIFICIAL Intelligence had its roots in theoretical work by the Aritsh mathematlclan Alan Turing and the Americans McCulloch and Aitts in the first hnlf of this century. However, nost of the work in this aren haa been done in the past 25 years. Until the late Sixties, most of it was done in the US, but aince then there haa been increosing activity in Russia, Japan, the Continent, and especially the UK. This conference reflected substantial progress by Continental researchers towards the UK and US standord.

In the last 10 yeara, it has been renliaed that many problems in AI can be solved only by equipping programs with sizable databasea of facts about their domain of application. This has led to impressive programs for diagnosing diseases, identifying unknown chemicals, analysing electronic circuits, and other tasks. It haa alao focused attention on the need for notational systems for encoding and managing large sets of facts.

Opinion la divided on whether AI requtres a special programming methodology and special programming languages. The standard languages are LISP and Pop-2, which supply flexible data structures and interactive debugging. There have been many attempta to supply "higher-level" languagas, which usually relect the theoretical viewpoints of their creators.

Must of thoae present at the conference seamed unenthusiastic about new languagea, but there waa a consensus that AI programs are subject to apecial complexities that make them hard to write and understand. The perception of the complexity of AI programs haa aroused interest in the automation of program-writing itself, and there were many papers on the subject, although most of the work is atill in its infancy.

There were severol papers on vision reaeorch, the attempt to provide computera with eyes. As in other research areas, there hns been no major "breakthrough" in vision work. Instead, we have hud to settle for the more modest satisfaction that we are beginning to understand the problam — or, rather, the large complex of problems — of analysing visuil input.

There were a few papers on language understanding, i.e. getting machines to communicate in a spoken or written humon language. It seemed to me that natural language research is in a aomewhat quiet period, possibly awaiting a shift in attitude, analogous to that in vision, toward the theoretical. This impression may ba due to the under-representation at the conference of work from the US, where most natural-language research is still being done.

There were severul papers on improvements of established AI techniques. Three such techniques are neuristic search (senrch through a practically infinite space guided by an estimate of distance to a gnal), problem reduction (attacking hard problems by finding and debugging plans for solving them), and theorem proving (searching for a proof to satisfy a query).

It is theorem proving that continues to attract most attention in Europe, against the advice of the more experienced Americans. I think, however, there is hope that the Europeans are profiting by American mistakes rather than repeating them, and are being coutious in their application of this technique.

The conference wos an enjoyable and profitable experience. This wns largely due to the skill shown by Derek Sleeman and Hons-Helmut Nagel in running it. I wos also struck by how harmonious it was. In the past, AI has often made up for lack of substance by loudness of arguments. Many conferences have witnessed nuisy debates over issues that seem, in retrospect, irrelevant.

There was only one good old-fashioned debate at Humburg, which turned on everyone's different understanding of the concept of "heterarchy" (which has to do with how progroms are organised into modules).

During the rest of the conference, attention was focused on narrow technical questions. This trend will have the effect of making AI much less glamorous to the uninitiated, which is as it should be. All sciences are boring from the outside, and we seem to be acknowledging at last that AI is a very difficult science, whose basic outlines are not yet visible.

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US industry boosted by defence budget

HESH WIENER REPORTS FROM NEW YORK

THE computer industry, along with electronics and communicationa, wus the recipient of a aubstantially increased value of US Defence Department contracts during fiscal year 1977, according to a study juat publishad in New York. Among tha big gulners were IBM, Texos Inatruments and Sperry Rand.

The study, a review of America's top 100 defence contractors, cites government figures that show the Carter Administration's planned spending for research and development us well as production crossed the $50,000 million barrier during the past year. The total value of contracts during fiscal yaar 1970 was $42,000 million.

Among the computer manufacturers, IBM made the most dramatic gain in defence contracts. In fiscal year 1976, the corporation was the 30th largest US defence contractor, receiving a total of $255 million, equal to 1.5% of its revanuea, from the military. This past year, IBM got $547.1 million in commitments from the same source, making it the 17th largest defence contractor. That sum represents 2.9% of IBM's revenues.

Honeywell managed to get its allocation from the Defence Department raised to $456.7 million in fiscal year 1977, up from $385.7 million the year before. Nevertheless, because other companies were moving ahead faster, the 15% of its revenues derived from defence work did not improve Honeywell's relative ranking among defence contractors, and the corporation slipped from 19th to 20th in 1977.

Sperry Rand, parent of Univac, stayed at 15th place among America's top defence suppliers. The $651.5 million Sperry was promised in fiscal year 1977, 19.0% of its gross revenues, was a big jump from the previous year's $505.5 million.

Texus Instruments moved from the 41st position to 29th between 1970 and 1977, and increased its portion of income derived from defence contracts to 15.8% from 0.3%. To do so, the company more than doubled the sum it was awarded, getting $324.1 million in 1977.

CDC ond Burroughs represent a much smaller part of tha defence business than other mainframe manufacturers. CDC, which in 1977 was the nation's 51st largeat defence contractor, got $132.5 million from the Defence Department, just a bit more than tha $121.7 million it had received in 1976. Burroughs, the 94th largest defence contractor, received only $66.5 million in defence contracts during fiscal year 1977, but that was still a gain from the pravious year's $55.4 million.

Pan Am network gets British-made VDUs

BRITISH-MADE telegraph compatible visual display units are replacing electromechanical teleprinters in Pan Am's Heathrow-based message switching network covering Europe and the Middle East.

Initial installationa in London, part of an £80,000 order for 30 ATS Vitel units, hava enabled Pan Am's 15 operators to handle 3,000 messages a day, said to be a conaidarable increase partly caused by the new stand-by tickets.

Further units will be installed in Paris, Rome, Tehran and Delhi, building up to a total of 250 in the company's Atlantic Region, all inter-linked through the STC ADX 6350 message switch at Heathrow.

Should Pan Am decide to standardise on the Vitel display in its New York and Hong Kong-based networks, it would need another 600 units bringing a total £2 million to ATS ...

Advantages of VDUs over teleprinters include ease of editing and correction of messages before transmission and much faster transmission ... 2,400 bps instead of ...

TIM PALMER PREVIEWS THE 29th SICOB WHICH OPENS IN PARIS NEXT WEEK

31 countries put their office wares on show

Among the peripheral manufacturers at Sicob will be Data Recording Equipment from the UK, claimed os Europe's lorgest supplier for OEMs. There will be a full range of DRE equipment on show including the 4000B 12 Mbyte twin platter disc drive seen here on the production line at Stalnes.

THE 29th annual Sicob exhibition opena next Wednesday, September 20. Nine days later, when the show closes on Friday September 29, some 300,000 visitors from 111 different countries will have taken the opportunity to examine the products from 1,755 companies in the computer and office equipment businesses. The companies from 31 countries, including a strong UK contingent, will be offering their wares from 628 stands which cram to capacity the La Defense exhibition centre in Paris.

Statistics can never tell the whole story, but they emphasise the range and scope of Sicob, which is still run more as a hobby than a business venture by a group of French entrepreneurs who decided 30 years ago that France needed a showcase to demonstrate to the world its offerings for the office equipment market.

The show, which is open from 9.30 am to 6 pm, but closed on Sunday, September 24, is best reached by the RER fast Metro line. The fast trains take about 15 minutes direct to the exhibition centre, whereas road travellers are frequently delayed for up to half an hour by traffic jams close to La Défense.

Air games

A REGULAR feature of Honeywell stands for many Sicobs past has been an exhibit designed to keep jaded show visitors amused. CII-HB is carrying on the tradition, and this year follows the aviation theme with a series of games involving simulated aerial navigation.

The line-up of exhibitors is as impressive as the raw statistics. Mainframers exhibiting are headed by the French national company CII-Honeywell Bull and the world number one, IBM, and also include Burroughs and NCR.

Minimakers turn out in even greater force, and Digital Equipment, Hewlett-Packard, Data General, General Automation, Computer Automation, Interdata, Modcomp and SEL from the US will vie with SEMS and Intertechnique from France and Norsk Data from Norway for visitors' attention.

As befits the flag-carrier of tha French industry, the CII-HB stand is always imaginative and eye-catching, and this year's display promises to be no exception.

Inspired by the futuristic Roissy-Charles de Gaulle airport to the north of Paris, the stand will consist of a number of satellites around a central concourse, each satellite featuring a different aspect of the company's business. The oirport theme will be emphasised with a departures board controlled by a Honeywell 316 minicomputer.

In one of the satellites, terminals attached to Level 64 and Level 66 machines at CII-HB's headquartera will demonstrate travel agency applications, and in another a Level 61 small business system with five displays and five printers will underline the versatility of the low-end line in applications for the small and medium-sized company.

The Level 6 minicomputer line, called Mini 6 in France, will be a key feature of the stand, since CII-HB is just gearing up to manufacture the minis in France, with large-scale production planned for next year.

The French public Transpac packet-switched network will not now begin public service until the end of the year, but several companies, including CII-HB are devoting exhibita to the network, and CII-HB will emphasise the hardware and software it has designed for getting on to Transpac.

Transpac will also be featured at IBM, where demonstration of a test attachment to the network using the Series 1 minicomputer is planned. IBM will also be featuring the System 32 and 34 small business computers, the Office System 6 word-processing system, to be shown for the first time with the Qume daisy-wheel printer, and the new 5110 desk-top computer.

IBM has three major stonds at the show, and one normally devoted to the French-built 3750 computer-based telephone switching system will this year be used to demonstrate the way in which voice, data and other office traffic can be combined in a single system. Intriguingly, IBM does not name the system to be demonstrated, which could be a hint that tha company is planning to launch the long-awaited successor to the 3750 at Sicob. It could also ba the new Series 1 communications controller for the word processing system.

Burroughs has not settled all the details of its exhibit, but plans to emphasise the baby of its low-end line, tha B80 office computer, which offers users a compatible growth path through the B800 to the powerful B1800 small mainframe.

Going after the same small business market, Kienzle introduces the 6100-8 under a new name, the 9066. Terminal driven and built around a Texas Instruments mini, it features Cobol, RPG II, Basic and Fortran.

Key-to-disc systems will be on offer from Data 100 Corp, CMC-France and MDS, and on the graphics front, Calcomp will show the new 930-100 controller, built around the French SEMS Solar minicomputer.

British companies represented will include Ferranti, DRI and EMI Technology. Ferranti Cetec will be emphasising the CDA 40 free-standing desk-top online graphics system with digitiser table, VDU and minicomputer.

DRI will show the Timedata interactive terminal. This is unique in that it is based on an array of light-emitting diodes which are touched by a light-pen in order to call up or enter data.

EMI Technology will feature the PIX remote communications facility for setting up a network around an IBM 370 mainframe — the first time PIX has appeared at Sicob.

ITT's CGCT subsidiary will be showing the full line of Unimat telephone switching systems, which range from the 4020 supporting up to eight lines and 32 extensions, to the 4080, which takes up to 400 lines and 2,000 extensions. Post Office regulations preclude ITT from offering any but the 4080 in the UK.

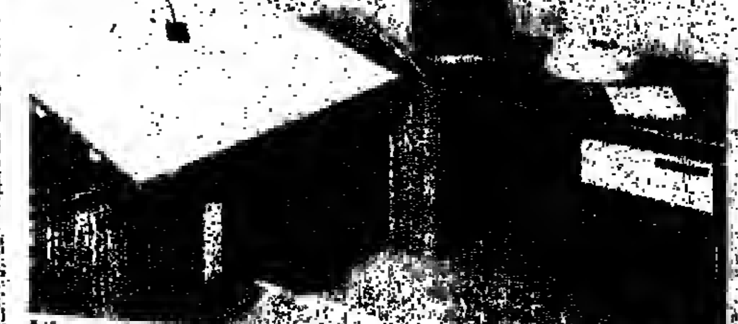
Intel will be offering the 80/30 single board computer and will also feature the new 8086 16-bit micro for the first time at Sicob.

Facit, exclusive European distributor for Qume products, will introduce the Sprint 5 daisy wheel printing terminal, which runs at up to 55 chps and sends and receives at 1,200 bps.

General Automation will be promoting the 220 DPS data entry system based on the GA 16/220 microcomputer, and will also feature the 16/340.

Diablo is to offer its new 1650 word processing terminal which runs at up to 1,800 bauds, and will also feature new forms handling equipment for the first time.

A small-scale telephone switching system, taking eight to 32 exchange lines and 50 to 200 extensions, and called the TLC 7, is on offer from Jeumont Schneider for the first time.



A feature of the Ferranti Cetec stand will be the CDA ... systems which are designed for a wide range of applications ... the same basic software for graphics generation.

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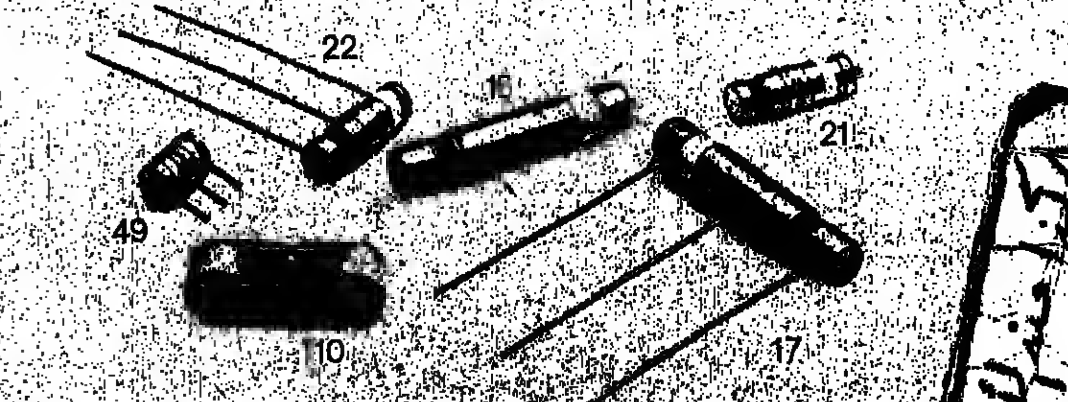

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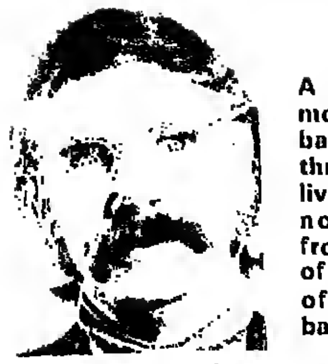


By Tim Palmer

A few weeks ago, one of the most celebrated distributed data base banking terminal systems, that of Bank of America, went live at the final branches on the network. Tim Palmer reports from San Francisco on the history of the system, the present state of development, and on the bank's plans for the future.

THERE is a bank in the US which has installed a counter terminal network. It captures much of the day-to-day data required to update its files at the point of transaction, records it all on disc — and then scraps it.

It may sound like the subject of joke, yet, not only does the bank exist, it is the world's largest.

"We never intended to do it any other way," insists Stephen Ernst, one of Bank of America's vice-presidents in the data processing services department.

"The tellers do not enter all the data on the cheque, and the present system could not handle it if they did. The system is cost-justified on the basis of the tellers' time which it saves. One of the main reasons for implementing the system was to improve the service we offer our customers, and it enables us to process more customers per hour than we could previously. Another advantage is that tellers no longer have to leave the counter to get account information."

Bank of America decided, in 1968, that it needed to provide some kind of online support to its branches.

"The introduction of batch computer processing put the clerical people in the branches in a worse position than they were in before the days of data processing," says Ernst.

"By 1973, our calculations showed that a teller terminal network would be cost-effective.

"We put out a specification for a terminal sub-system which would have some local intelligence.

"Bunker-Ramo won the contract with a variant of one of its existing brokers' terminals, and designed a branch controller to our specification. It has the DEC PDP-8 instruction set in the processor, which Bunker-Ramo builds, and integral modems from Racal-Milgo. The initial contract was for 1,200 controllers and 8,000 terminals.

"Our plan was to run a mainframe based system to support the terminals, and we had settled on IBM 370s using the Airline Control Program.

"We had bought ACP, together with the software support documentation, from United Airlines, and were about to acquire four 370/168s to run the system when our advanced planning department completed an initial study of, what they called a Distributed Computing Facility. The results of the study indicated that by using minicomputers, we could build a lower cost system which would give more reliability and easier growth."

Board approval was sought for the 168s, and also for a test model of the minicomputer alternative. Five companies were asked to submit proposals for a test model of the distributed system, and the initial contract was won by General Automation in April, 1973.

"By October, GA had a working feasibility model up and running," says Ernst. "The board granted approval for the mainframe system, and also agreed that the GA system be turned into a production model.

"IBM did not put in a bid, and DEC was ruled out because it wanted to farm out the system software to another company, whereas we wanted it done by the supplier.

"There were 11 bids, and five met our requirements. The five were Honeywell, NCR, General Automation, Modcomp and Fujitsu of Japan.

"General Automation was the cheapest, and thus won the contract."

Thus, the Bank of America Computerised Office Online System, Cools, was born. GA did the system software, with assistance from the bank, and Bank of America did the applications software.

"We started installing pilot terminals, supported by the IMS/DC control software on 370s while Cools was under development, and half the branches were on that system before Cools was ready," says Ernst.

"We patched it together using our existing batch hardware and moving the system around different machines as necessary."

The fundamental unit of the system is the module, and each module consists of four GA 16/440 minicomputers.

The four minis are linked in an H arrangement, with the back two minis, at the top of the H, used as file handlers while the front two handle messages.

Bank of America has two main computer centres, one in San Francisco and the other in Los Angeles, and there are currently six modules installed at each centre. One module acts as a Network Operations centre at each site, and no component in the system is run at more than 50% of its rated capacity. If one mini in a module fails, its neighbour takes over; if one module fails, the next one takes over, and if one whole centre goes down, the other centre can support the whole network. There are two 9600 bps SDLC lines between the centres.

Four of the six modules at each centre handle checking and savings account inquiries, and one handles online data entry; each module is designed for eight transactions a second, and they are presently running at six a second. Each module is backed by 200 Megabytes on disc, and carries the files for the branches to which it is dedicated; the bank has 1,100 branches, and there are over 8,000 terminals installed at present.

The system software was written in GA assembler, and the applications software in a proprietary macro language.

"We plan to begin using Cobol and Pascal next year," says Ernst, "but we felt it unsafe to use high-level languages to start with because we were unsure how much core we would need."

The original plan was to use bisynchronous communication, but a study of SDLC and of X25 indicated that 20% better line utilisation would be achieved with an SDLC-type protocol.

"We used IBM's 1974 definition of SDLC, but added a contention mode of working, so we call it SDLC-BA," says Ernst. The message processors poll the terminals, but contention mode is used between the processors in each module.

Before the start of the business day, the new account balances are recorded on the system, and adjusted as customers carry out transactions. At the close of banking hours, the system automatically switches to late cash mode, to support the out-of-hours cash service which the bank operates. These late transactions plus details of any new accounts opened during the day, are batched up on tape and are the only ones which are retained for updating of the central files. All the normal hours transaction records are scrapped at the end of the day, and the mainframe files are updated overnight from the cheques and deposit slips which are delivered to the computer centres.

The last branch went onto the Cools system a few weeks ago on July 24, and the system now handles 11 million records of savings and checking accounts.

All the normal hours transaction records are scrapped at the end of the day, and the mainframe files are updated overnight from the cheques and deposit slips which are delivered to the computer centres.

"Even in the worst case when we would have spent $18.6 million for four 168s, the system was cost justified, but by using General Automation minis, we reduced the hardware cost to $ million. The actual minicomputer software cost came to what we had budgeted to spend on mainframe software, so those costs were about even.

"It certainly took us longer than we had anticipated to develop the system, but one reason for this was that it was done by the stuff we had available, and this included 90 people we had hired for their experience with the Airline Control Program.

"We misjudged how long it would take to retrain them on minicomputers, and Bank of America had no experience of developing control program software for a minicomputer.

"But what we now have is a very flexible and expandable system, whereas with the classical approach we had planned, there was no way we could have gone above 8,000 terminals and 60 messages a second."

The mainframe computers are complexes of six or seven IBM 370/168s and 3033s, plus one 370/195, at each centre. They run under the MVS operating system with the JES-3 job entry system, and one master machine at each centre controls all the others.

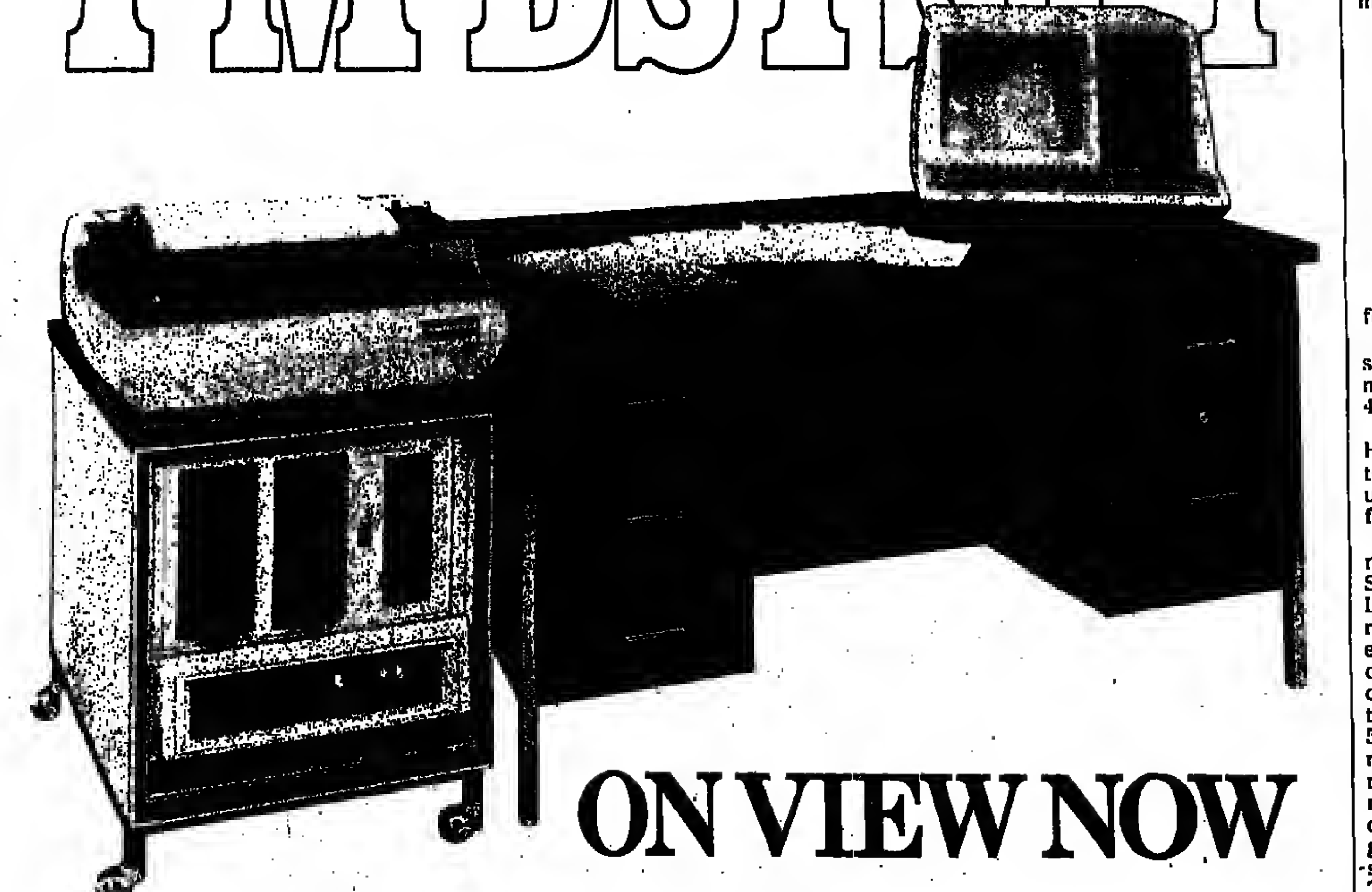
"We shall be installing two new modules at each centre, and new applications, and loan administration will be among the first," says Ernst.

"We are getting together a group to look at our needs over the next five years.

"We may merge the terminal system with large mainframe teleprocessing.

"But we have no intention of following Citibank's wholesale move to minicomputers, as mainframes are becoming more and more cost effective for batch applications," says Ernst firmly.

PM-DSYST-1



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International PTTs hold key to telecoms growth

TECHNICAL problems relating to the growth of data communications services can be solved, but the real brake on international developments is more likely to come from a failure of telecommunications authorities to develop agreements quickly on standards, tariffs and other policies and strategies.

That was a central theme which emerged from a two-week NATO Advanced Study Institute conference of telecommunications specialists which ended last week.

Over 60 delegates from Europe and North America attended the conference at the Chateau de Bovas in the south of France, and organised by Dr Ken Beauchamp, director of Lancaster University computer services, and Dr Jack Howlett, chairman of the National Committee on Computer Networks.

Professor Peter Kirstein of University College, London, put his finger on the nub of the problem when he opened the first session.

Standards, he said, are a key area. There would be a growing need to link private networks to public networks and to interlink public networks in different countries.

But he posed the question: Who has the power and who has the will to force the necessary agreement?

"Yesterday's experiments are today's services and today's experiments are clearly signs of tomorrow's needs," he said.

And if delegates failed to realise the significance of this, Dr Helms, of the Ispra research centre in Italy, discussed some of the major current "experiments" in the European public telecomms scene, such as Euronet, EIN and the European Space Agency projects.

Although co-operation between European PTTs is good, he said, it would take "a lot more talking" before a full around-the-clock service was possible.

Some of the problems awaiting international and national solutions were outlined by Ray Feldman, of the British Post Office. These relate to topics such as data ownership, operational needs and transnational data flows, needs for standardisation and tariff agreements.

One new area in which this need was becoming particularly urgent is in satellite and packet radio computer networks.

But time and again the discussions returned to the dilemma that, while technical advances continue to be rapid, policy agreements lag behind.

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Ford links-up to Cyber

DESIGN engineers at Ford can now link in to a new Control Data Cyber 176 based at the Dearborn Engineering and Research Centre near Detroit. The new system, which replaces an IBM 650 that has been in service since 1957, will service 85 locations throughout Europe, and US and Asian locations.

Among many new facilities available to the engineers using the new system will be colour video displays indicating stress points on vehicles under design. The system will thus allow quick identification of areas where weight can be saved or where additional rigidity might be needed.

'Regulatory regime will inhibit electronic message systems'

THE regulatory mechanisms developed to monitor and control Electronic Message Systems are likely to inhibit the growth of such services.

That is the conclusion of a report* prepared for the US Federal Communications Commission by Kalba Bowen Associates of Cambridge, Massachusetts in conjunction with the Centre for Policy Alternatives at the Massachusetts Institute of Technology.

In Europe, the report suggests, electronic message services are likely to become part of the State PTT monopoly, but in the US it could lead to the opening of mail services to private enterprise.

Echoing the Nato communications conference (see above), the report believes that, whatever regulatory method is chosen, the limits to growth of the services will relate to administrative and management issues rather than to technical developments.

"The prospect that computer terminals will become the printing press of the future and data networks the medium through which the creation and dissemination of ideas takes place is certainly foreseeable," states the report.

"In that event, some future users of the medium will, we expect, find the regulatory regime inhibitory to their purposes..."

The report warns the FCC that regulations of this nascent technology could become almost impossible "if or when EMS moves from being a specialised business service to being a major means of social expression and communication."

Furthermore, the report contends, the US Postal Service will not play a major role in the widespread development of EMS services, "for institutional and policy reasons, including an unwillingness to duplicate the work of private enterprise, and a lack of R&D capability."

Although it is "unlikely" that the USPS will provide more than selected EMS services, the report says, the siphoning off of much traffic into private electronic channels would adversely affect postal unit costs and postal deficits.

The report urges the FCC to undertake immediately additional studies on such specific areas as the likely costs and capital requirements of establishing public, nationwide EMS services; the economic effects of EMS services offered by existing or new carriers on other carriers and services and the international issues raised by EMS.

*The 300-page Electronic Message System report is available at $30 per copy from Kalba Bowen Associates Inc., 12 Arrow Street, Cambridge, Massachusetts 02138, US.

US tests computer generated mail plan

A SERVICE called Electronic Computer Originated Mail, Ecom, which should enable letters to be delivered to almost anywhere in the US within two days, is to be tested by the US Postal Service in co-operation with private contractors.

If Ecom goes live, organisations using the service will transmit computer generated letters and address lists to a contractor specialising in mail dissemination. The contractor will then transmit the letters over his network to the relevant Post Offices anywhere in the US.

At each Post Office they will be printed out, put into envelopes and delivered by the Postal Service as part of the first-class mail.

One firm understood to be interested in being a mail dissemination contractor is Western Union.

The US Post Office wants private sector firms to operate Ecom networks because the electronic movement of information is not within its present mandate. However, in the longer term it could introduce its own electronic mail service and is currently evaluating equipment.

There are also plans to start experimental electronic mail transmissions between the US and Europe early next year (CW, June 15).

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With the NORD-10/S, associated peripherals and software programs, we can offer flexible and economic computer systems for most dataprocessing activities. A NORD computer system will never be too limited to meet new requirements. The initial installation can be extended as new demand grows. Give us a call and find out how we can co-operate.

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Candidetes should have sound RPG II progremming end design experience using lerge IBM System 3 mechinery. The ebility to work on one's own initiative end react to user requirements is of prime importence. Besed in West London the person eppointed will be required to travel to oversees computer centres.

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FURTHER APPOINTMENTS APPEAR ON PAGES
20, 21, 22, 23, 24, 25, 26

DatasolveDatasolveDatasolve

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Various Contracts.

For further details or advice on these or other **U.K.** and **European** Contracts, call Sue Smyth, June Mogg or Jane Asbury, NOW! on 01-491 4706 or 01-439 3411.

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ICL
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MICRO/MINIS
FORTRAN + RSX11 - London
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CORAL 66 REALTIME - Dorset
MACRO 10 + TOPS 10 - Holland
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FORTRAN - London/Holland
BASIC + RDOS - Hants.
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All vacancies are open to both male and female applicants.

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Knight Computer Services Limited,
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Staff Services Division of BOC Datasolve Group and a member of Computing Services Association.

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Salary is negotiable but will not be a limiting factor for the right person.
Contact: Jim Baker

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Contact: Jim Baker

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The group is responsible for software development and technical support both to the company and it's clients, and plans for the immediate future include developing applications for various MICROS and as well as for the PDP 11's already on-site.
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For further information on any of the above vacancies please contact the appropriate consultant.
If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

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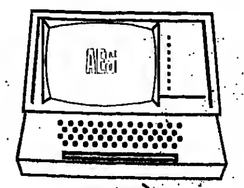

If you've heard of screen typing systems, you've heard of AES and Wordplex, the market leaders. If you haven't heard of screen typing, now is the time to find out the opportunities for you in this most exciting and fastest growing area of the office systems market.

AES and Wordplex are now one company, in the UK and internationally. Put two market leaders together and you have a force to be reckoned with!

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For further details please contact Tony McGrath, or send your C.V. to the address below in the first instance.

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AEG 80-20 Siemens 330 M6800

Candidates should preferably have a working knowledge of German or be prepared to take language tuition paid for by the company.

We also have vacancies in the Head Office in London as well as for our new Manchester office for work on industrial systems in the U.K. and Western Europe.

Please reply to:

Roy Stedman, DAI GmbH, Herzogstrasse 61, 6078 Neu Isenburg, (nr. Frankfurt). Tel. 06102-38386

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We offer:
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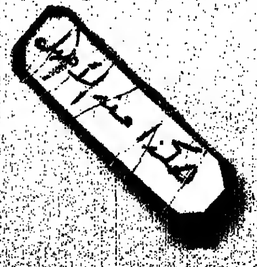
COMPUTER WEEKLY



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For this you will need at least 2 years' experience of IBM Assembler with OS/VS 2 Release 1 or 2. Additionally, you will need some practical knowledge of some of the following:— TELEPROCESSING APL HASP DATABASE SYSGEN

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For details of these and many other posts please contact in the strictest confidence:

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Is your future with Pye TMC in the West Country

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Scientific Programmers

To work on the development of software tools for C.A.D. - design automation, automatic testing and advanced graphics systems. Junior and Senior level vacancies available. Experience of electronics design and FORTRAN programming required. Degree qualification preferred.

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To write and debug L.S.I. test programmes, in close liaison with the logic design engineers, for our [illegible] VII, and for [illegible] test systems. Knowledge of circuit and logic device design and familiarity with computer or A.T.E. techniques is essential. Degree or HNC qualification preferred.

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To work on the realisation of LSI circuits from the logic design to the final layout stage, using advanced C.A.D./D.A. and graphics. Senior positions exist for Engineers with several years experience of IC design work. Degree or HNC qualification preferred. Intermediate level vacancies call for relevant experience. HNC preferred but full training will be given to the right applicant.

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To work on the design, development and maintenance of Programs for C.A.D. and design automation of LSI circuits. Knowledge of FORTRAN programming and electronics plus relevant experience. Senior and Junior vacancies. Degree or equivalent qualification required.

Act Now

Excellent negotiable salaries are offered together with the full range of large company benefits, including relocation expenses where appropriate.
Please write quoting reference VJ/RG and giving details of education, career to date and current salary to the Recruitment Officer, Pye TMC Limited, Malmesbury, Wiltshire, or 'phone Malmesbury 2121 Extension 281.

National Coal Board
Mining Research and Development Establishment

The expanding programme of the Establishment covers research, development and testing in all fields of science, technology and operational techniques applicable to coal mining. This year the Establishment is recruiting scientists and engineers to increase its effort in key areas of mine productivity and safety.

There are a number of new posts for

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MINOS is the standard colliery process control mini-computer system developed at MRDE. Work is in progress to develop a range of applications at collieries in conjunction with a number of systems suppliers.

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Applicants should have a degree in computer science or in an engineering or science subject and have practical experience of program development in process control systems for industrial applications; experience of RSX11 and CORAL 66 would be an advantage.

The starting salary for these posts will be according to qualifications and experience in the range £3,800 – £6,500. Excellent benefits include nearly 6 weeks annual holiday.

Please apply to the Staff and Administration Manager, quoting reference no 750.

National Coal Board,
Mining Research and Development Establishment,
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Staffs, DE15 0QD.

NCB MINING RESEARCH AND DEVELOPMENT ESTABLISHMENT

INNER LONDON EDUCATION AUTHORITY
LONDON COLLEGE OF PRINTING
SCHOOL OF SCIENCE AND TECHNOLOGY
SENIOR LECTURER IN COMPUTER TECHNOLOGY AND INFORMATION SYSTEMS

The Senior Lecturer is required from 1st September, 1978, or as soon as possible thereafter to lead developments in Computer Technology in the College.

This is a particularly challenging post to those who have the necessary drive and enthusiasm, both to be responsible for computing throughout the College and to identify and expand those areas of the College's work when computing is applicable.

The successful candidate should ideally be a graduate in Computer Science and/or a member of the British Computer Society and will be capable of teaching within Honours Degree programmes and furthering research in this area.

Appropriate industrial experience would be advantageous.

Salary in accordance with Burnham F. E. Report £6051-£7065 (bar)-£7572, subject to formal approval, plus £402 Inner London Allowance.

Further details of the post and an application form, returnable within 14 days may be obtained from the Senior Administrative Officer, London College of Printing, [illegible] and Castle, London [illegible] (Ext. 227).

THE UNIVERSITY OF MANCHESTER
DEPARTMENT OF ORTHODONTICS
RESEARCH ASSISTANT IN COMPUTER GRAPHICS

Applications are invited for this three-year post. Duties will include the computer programming of mathematical formulae related to the analysis of skull X-ray pictures, to aid the clinical diagnosis and treatment of patients with facial deformities. Applicants should have computing experience including fluency in Fortran, a mathematical interest and a good honours degree. Salary £3,384-£3,883 p.a.

Further particulars and application forms (returnable by September 28th) from the Registrar, The University, Manchester M13 9PL. Quote ref: 220/78/CW.

NEXT WEEK
NORTHERN RECRUITMENT FEATURE

Advertisers are reminded that the next Computer Weekly area feature will be published on September 21 and will highlight career opportunities in the North.

Space reservations should be made as soon as possible to:
Owen Kelly — Manchester — 061-872 4211
Eddie Farrell — London — 01-261 8097
Copy Deadline: PM Friday before.

COMPUTER WEEKLY
THE INDUSTRY'S WIDEST READ AND MOST REQUESTED NEWSPAPER

EMI

SALES AND SOFTWARE SUPPORT - UK/EUROPE

Pix Success in Europe creates new key jobs with EMI Data Communications

The PIX Remote Computing Facility is an intelligent data communications system which offers IBM users the most advanced teleprocessing facilities. Its successful European launch from the U.K. earlier this year gives EMI clear market leadership in Data Communications.

IBM users have been shown how to avoid the complexities and limitations of conventional TP techniques at over 500 installations in U.S.A. and Europe.

To continue the Europe-wide expansion EMI need more key people. These are probably the most important Data Communications openings of the year, with earnings capability to match.

Only the best need apply.

SOFTWARE SUPPORT ENGINEER.
Based in U.K. but able to travel throughout Europe. Directly responsible to the Product Manager.

Applicants must have 2-3 years IBM System Programming experience with in-depth knowledge of operating systems and TP monitors/handlers.

SALES CONSULTANTS.
Front line selling of PIX systems. Vacancies in the U.K., France, Benelux, Germany and Scandinavia.

Applications are invited from people with proven sales success who have a working knowledge of IBM teleprocessing concepts. Successful applicants will be expected to be locally resident.

Please apply giving brief personal and career details to:
S.J. Keat, Director SE Labs (EMI) Ltd.,
EMI Technology (Data Communications Division),
Spur Road, Feltham,
Middlesex, TW14 0TD, England. Tel. 01-890 1477.

EMI A member of the EMI group. International leaders in music, electronics and leisure.

Systems Software Programmers - Germany.

Our parent company in Germany is looking for young professionals with the right background of administrative training and with several years experience in programming, particularly of assembler type language.

The successful applicants will be self-motivated so as to plan and initiate software projects with adherence to strict time-schedules. Projects will include systems for printing and visual display text processors and for accounting systems in the middle range of data processors with particular attention to order processing, materials handling and accounting applications. The work is essentially market orientated and will include travel in Germany and throughout Europe to introduce new standard software packages and to give sales and technical support.

The post is based in Wilhelmshaven, West Germany, and salary and conditions will be of a high order. Knowledge of the German language is not essential but would be of advantage.

Applications should be sent in writing to:
A E Perry FCA, Olympia Business Machines Co Ltd,
203/205 Old Marylebone Road, London NW1 5QS.

Olympia
Better Business Machines

NEW INSTALLATION

SOUTH YORKS

DATABASE SYSTEMS DESIGNER

A medium-sized manufacturing Company is currently recruiting a small programming/systems design team to be headed by a Database Systems Designer, reporting directly to the D.P. Manager.
He will play a leading role in developing advanced systems from conception to implementation. The system will be based on a large configuration of the General Eclipse C330 mini computer using an advanced operating and file management system.

The qualifications required for this position are as follows:

- ★ experience of Project Leadership and design in a real time environment
- ★ Database knowledge, gained within a mini computer environment
- ★ preferably be educated to Degree/HND level.

In keeping with the importance of this position a substantial salary will be offered in order to attract applicants of the highest calibre and background.
The Company is located in low cost housing area of Yorkshire with excellent communications and close to rural parts. Normal large Company benefits apply to this position including; a low cost contributory pension scheme, subsidised canteen, and relocation expenses where applicable.

Ref. No. CW/9/2

CONTACT: David G. Wade on 061-833 0427, or 0785 56013 after office hours.

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Freepost 6, 102 Blandford Street, London W1E 1JZ

Computing Services Association

UNIVERSITY OF KENT AT CANTERBURY
FACULTY OF SOCIAL SCIENCES
PERSONAL SOCIAL SERVICES RESEARCH UNIT

RESEARCH FELLOW IN COMPUTING

Applications are invited from specialists in computing for the post of Research Fellow in computing for social research at the Personal Social Services Research Unit with effect from 1st October, 1978 or as soon as possible thereafter. The appointment will be for one year only. However, the Personal Social Services Research Unit is currently negotiating a new contract with the funding body the DHSS and the successful applicant will be encouraged to apply for any longer term post which will eventuate from a new contract.

The Research Fellow will be responsible to the Director of the Unit, Professor B. P. Davies. He/she will be expected to participate in data analysis as well as advising the Director on the design development and implementation of systems for computer handling in all the activities of the Unit including new and special surveys and projects.

Salary according to qualifications and experience will be within Range 1A or II of the Research and Analogous Staff scale £3883-£7754

Application forms and further particulars may be obtained from Mr. V. Preece, Senior Assistant Registrar, The Registry, The University, Canterbury, Kent. Completed application forms (three copies) should be returned not later than Friday, 13th October, 1978. Please quote reference number A33/78. Informal enquiries should be made to Professor B. Davies.

TIME TO RELAX!!

Summer in our Company is Unique. For two entire weeks the Computer Department transfers, unofficially, to the Stewards' Enclosure and does fundamental research on:

(1) How a glass of Pimms converts old men into young boys, complete with school Blazers!

(2) The effect of a given amount of this Unique Youth Drug on the performance of Computer Depts.

The effect can be truly amazing. This year, for instance, a thoroughly youthful and naive DPM believed our REP that conversion from an IBM 3-15 to a 370-125 was SIMPLE!

Hence this Autumn we urgently need an assistant DPM who has a thorough knowledge of low end 370 machines and at least a working knowledge of 3-15's under CCP. The rewards are tremendous (Ascot, Henley and Michael Parkinson's local cricket team) and the pay is not bad either!

(By the way, we also need a junior programmer — so if you know RPG II and can row a bit . . .)

Please ring our consultants

KEY COMPUTER PERSONNEL
01-949 3140

CO-OP COMPUTER SERVICES
CWS Computer Group

Project Manager
1900/2900 Operations
Manchester based
up to £9000

CWS Computer Group operates a network of ICL mainframe computers, at the centre of which is currently a 2 x 1904S installation, to be replaced in late 1979 by 3 x 2960's.

We wish to appoint a manager with extensive operational experience to take overall project responsibility for the planning, installation and transition from 1900 to 2900, both hardware and software.

He/she will have full project authority reporting directly to the General Manager, CWS Computer Group. On completion of this project assignment the appointee will take up a senior line management position within the Group.

Applicants with direct experience of either transition/conversion to 2900 or conversion from one manufacturers equipment to another and a proven record of management achievement would be best qualified for this exciting and demanding job.

If you believe you have the management skills, the experience, the drive and dedication necessary to ensure the successful completion of a project of this nature, then contact immediately:

P. J. Cropper, General Manager, CWS Computer Group, New Century House, Manchester M60 4ES
TEL: 061-834 1212 ext 6820 (office hours)
062-683 789 (evenings)

OPPORTUNITIES IN SALES MANAGEMENT

London and Birmingham
Mini Computer Industry
Commercial/Financial Sectors

Basic Salaries to £8,000
Full 12 months guarantees
Company Car or Allowance
Usual expenses and fringe benefits

We are to identify suitable applicants to fill key positions with a leading manufacturer. Applications are invited from established managers or senior sales executives ready for management. Full job details are available and interested applicants should telephone to arrange a mutually convenient appointment.

CONTACT BOB BOWER, ADVISING DIRECTOR
Ref. CW/29/1

HUTTON EXECUTIVE SELECTION LTD.
HUTTON HOUSE,
HUTTON STREET, LONDON EC4Y 8HP.

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CONSULTANCY

London Based
To £11,000
Implementation
Manager/Estimator
Computer Systems

Our Clients are a leading international computer consultancy. They are seeking a senior DP executive with a wide variety of experience in the industry covering mainframe/mini/micro manufacturers and considerable programming, analysis and management experience. A major factor is the ability to cost and estimate manpower resources and computer systems' implementations.

Brief candidate profile:

- ★ 30-40 years old
- ★ Graduate (either numerate subject or computer sciences)
- ★ Willing to travel abroad for short stays
- ★ Creative with excellent communicative abilities
- ★ Good technical background
- ★ Breadth of experience particularly in costing and estimating

Full job specification is available at interview and interested candidates should contact BOB BOWER, ADVISING DIRECTOR.

Ref. CW/29/2

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CIRCA **£6,500** P.A.

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To be involved in defining requirements for a new generation of medical imaging equipment.

If you have a wide physics or engineering background with special expertise in any of the above areas, this could be for you.

Our client, based in South East England, offers **total systems involvement within a wide range of disciplines in a creative environment working to exacting professional standards.**

For further information on this interesting and unique career opportunity contact **Mark Irens** now.

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JUNIOR PROGRAMMERS
£3,000 to £4,300

S E. ENGLAND

You have only 1 year's commercial experience? Then you are in great demand. We have a large selection of first-rate companies who need people like you. Some offer mortgage assistance to the right candidates after short period with them.

CW 37/1 Tricia

PROGRAMMERS AND ANALYST PROGRAMMERS
£3900 to £7400

LONDON, HOME COUNTIES AND MANCHESTER

We are inundated with COBOL, ASSEMBLER and PL/1 vacancies. If you have more than one year's experience, why not ring now for a confidential chat? After 8 years' in the business we really know the market place

CW 37/2 Michael

PROJECT LEADER
£8,000

S.E. LONDON

A small but famous International Bank requires a mature applicant to take charge of a small team dealing with banking systems re Payment Transfer and Foreign Exchange, so DEC RSX11 and supervisory experience is a must. Perks are excellent, including free meals and low rate mortgage payments.

CW 37/3 Michael

SENIOR CONSULTANTS
£8,500-£12,000

CENTRAL LONDON

Six large, well-established consultancies wish to recruit systems people with all-round experience on third generation equipment and the right personality to deal with clients who require first-rate service. Technical Communications Consultants are also required where in-depth implementation experience of IBM or ICL latest ranges are essential. Excellent fringe benefits and prospects

CW 37/4 Michael

OPERATOR/SHIFT LEADER
£4,000 to £5,400 inc.

N/R FELTHAM

A major chemical organisation is looking for a number of qualified operational staff with good IBM JCL and OS experience. Excellent perks available. Subsidised canteen, C.P.S., 4 weeks' holidays plus yearly bonuses.

CW 37/5 Tricia

SHIFT LEADER
To £5,000 inc.

N LONDON

A major manufacturing organisation with a 2 shift ICL GII + installation requires an experienced senior ICL operator. The company offers free meals, C.P.S. and four weeks' holidays

CW 37/6 Tricia

OPERATORS
£3,500 to £4,500

ENFIELD

A major industrial nationalised corporation is eager to recruit ICL GII operators where the latest ICL 2900 is arriving very shortly. Perks include C.P.S., restaurant and excellent sick pay scheme

CW 37/7 Tricia

SENIOR OPERATOR/SHIFT LEADER AND OPERATIONAL ANALYSTS
£5,300 to £6,300 + inc.

C. LONDON

Here is a chance to join an advanced IBM DOS/VS POWER/VS installation that has really excellent promotional opportunities. The operations analysts do not work on shift but must have 4 years + experience. Perks include discounts on goods, free lunches, 4 weeks' holidays, etc

CW 37/8 Tricia

FREELANCE PROGRAMMERS
To £260 p.w.

ICL COBOL GIII	City	3 months
ICL Sys/4 Usercode	Liverpool	3 months+
ICL Systems Analyst	S.W. London	3 months
ICL 2900 COBOL	Fluent French-Luxembourg	6 months
ICL 2904 An/Prog.	Bank in Nigeria	8 months

Apply NOW for the latest vacancies IBM, HONEYWELL, DEC & ICL programmers welcome. Earn a Xmas holiday paid break plus an attendance BONUS. Ask for the Contracts Officer on 01-995 4148 Irene.

SYSTEMS ANALYST/SNR S/A
£6,300 to £8,200

NR ILFORD

Our clients are a famous clothing manufacturers with a major investment in D.P. Their H6000 computer is expanding and there is an urgent requirement for 2 Business Analysts who really know how to advise new departments on new systems developments.

CW 37/9 Michael

TIME SHARING PROGRAMMERS
To £6,800

C. LONDON

If you have had time sharing experience involving the use of FORTRAN, BASIC or ASSEMBLER, then we have four nationally known companies who would offer you an exciting job in pre or post sales support. Some offer generous bonus schemes

CW 37/10 Michael

MINI COMPUTER PROGRAMMERS
£4,000 to £8,250

LONDON & HOME COUNTIES

If you have experience in ASSEMBLER or micro-code or communications for at least 1½ years then a whole exciting field is open to you. We now have opportunities in S.W., N.W. or W. London, Surrey, Berks and Hertfordshire for competent people in this rewarding field. The future is definitely going to be with the MINI-computer professional. Telephone for details.

CW 37/11 Michael

MINI SALES ENGINEER
£8,000 + CAR + COMMISSION

MIDLANDS AND LONDON BASED

Two major mini manufacturers require experienced salesmen with real-time or process control sales experience. These firms are going places so join now. Quote earnings up to 13K in first year plus excellent perks

CW 37/12 Michael

UCA

RECRUITMENT CONSULTANTS

Universal Computer Associates Ltd., Data Express House, 3 Prospect Place, Heathfield Terrace, Chiswick, W.4.

01-995 3883 (01-958 6138) EVENINGS

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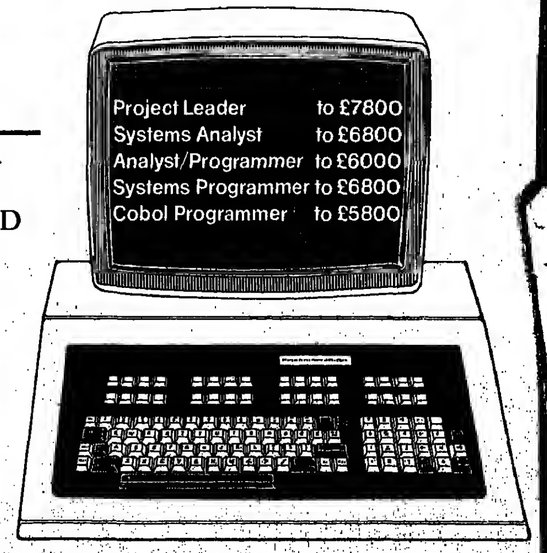
We'll give you a new mini, and half a million.



*NORTH LONDON*5 WEEKS HOLIDAY *OVERTIME PAYMENT SCHEME*SUBSIDISED RESTAURANT*ON-LINE DEVELOPMENT FACILITIES*EXCITING NEW PROJECTS & HARDWARE*GENEROUS RELOCATION PACKAGE.

The mini, a powerful ½ million byte Interdata 8/32 will be linked locally to an IBM 370/138 to provide a configuration with exceptional batch/TP capability. This will support advanced new marketing, manufacturing, and financial systems to be developed to professional standards using TOTAL data base and a VDU network.

Our clients are a major manufacturing company and market leaders in their field with a successful history of growth and profitability. They employ over 4,000 people with a turnover in the region of £70m.

If you have the necessary talent for these exciting new projects, then we would like to hear from you. Experience on the hardware is not essential as any necessary training will be given.

Please send brief details to Position No. AKW6974 or telephone Neil Beckingham at Austin Knight Ltd., London W1A 1DS. Telephone 01-439 8681.

Applications are forwarded to the client concerned, therefore companies in which you are not interested should be listed in a covering letter to the Position Number Supervisor.

Austin Knight Ltd.
20 Soho Square, London W1A 1DS
Telephone 01-439 8681

These positions are open to both men and women.

Tameside Metropolitan Borough

Computing

PROJECT LEADER

PO1C £6613-£7230 p.a. Inclusive of supplements

To be responsible for one of three teams of analysts and programmers and reporting to the Development Manager. Candidates will have drive, initiative and the ability to motivate their team in addition to a high level of expertise in systems analysis and design.

SYSTEMS ANALYST

PO1A £5727-£6342 p.a. Inclusive of supplements

As next in seniority to the Project Leader candidates should have designed and implemented computer systems. Applicants with a programming background and knowledge of systems procedures will also be considered.

SENIOR PROGRAMMER

AP4/SO1 £4248-£5586 Inclusive of supplements

Applicants should be ICL 1900 series Cobol programmers preferably with George 3 or communications experience. The successful candidate will work in one of three project teams and be expected to assist with the supervision of more junior programmers.

TRAINEE PROGRAMMER

Up to £3551 p.a. Inclusive of supplements

Applicants must have a sound academic background. Appropriate training in Cobol will be given if necessary.

The starting salary paid in all cases will depend on qualifications and experience. The Computer Centre, based in Ashton-under-Lyne, comprises a 128K ICL 1903T running under George 3, for which further enhancements are planned. There is an ambitious development plan which includes development in database techniques and VDU based systems.

Flexitime working operates and assistance with relocation expenses will be given in appropriate cases.

Please write or telephone for a job description and application form (to be returned by 26th September), to the Chief Personnel Officer, Mercian House, Mercian Way, Ashton-under-Lyne, Greater Manchester. Tel: 061 330 8355 Ext. 2.

FIELD SERVICE ENGINEERS

NEW CAREER START c.£5,500

(Plus overtime + standby allow. + car + training)

One of the World's leading Micro/Mini Computer manufacturers are about to establish a new branch office — this could be your chance to get ahead with prestige products with world-wide acclaim — they offer a generous starting salary + car + bonus and other benefits. If you are a bright Young Service/Customer Engineer with good academic background/electronics experience and living in London or Home Counties, then take a big stride forward to an exciting new career with excellent future prospects by calling today . . . but hurry!

Ref EK 2066 (Consultants).

AB EXECUTIVE (KINGSTON) LTD. 01-546 9473

ANALYSTS PROGRAMMERS OPERATORS

ANALYSTS & PROGRAMMERS LEEDS £4500 to £7000
IBMs and Large Minis for Time Sharing and On-Line development. (Peter)

OPERATIONS SUPERVISOR LONDON SW1 to £5000
Female or Male, In-House Mini. (David)

SYSTEMS PROGRAMMER N/NW LONDON to £7000
Installation Software Support. 8yte based experience please. (Peter)

SCIENTIFIC/TECHNICAL PROGRAMMERS SOUTH COAST c. £5500
Mini Assembler or Fortran, Process Control, Real Time, Simulation. Opportunity for foreign travel. (David)

PROJECT LEADER SOUTH MIDDX. to £7500
Project Leading and Business/Financial experience. (Peter)

SENIOR PROGRAMMERS LONDON W2 to £6000
ICL Cobol for On-Line Text Processing. (David)

OPERATORS SOUTH MIDDX. £3600 to £5400 incl.
From 2 months' any exp. to 2 years' OS/VS1 at top end. (Peter)

COBOL PROGRAMMERS SOUTH MIDDX. c. £4850
1 year plus any Cobol for On-Line Installation. (David)

COBOL PROGRAMMER WEST END to £6000
Coms and Ibarn more about T/P and Databse. (Peter)

ANALYSTS or ANALYST/PROGRAMMERS ESSEX BORDER c. £8400
M.I.S development work. Relocation. (David)

TELEPHONE: 01-839 6087
Peter Berson
(Even. & Weekend 0702-52162)
David Ward
(Even. & Weekend 0263-38880)

Barnard, Davies & Ward Ltd.
Computer Personnel Consultants
107 Jermyn Street, London, SW1Y 6EE

BARNARD DAVIES & WARD LTD

THE UNIVERSITY OF ASTON IN BIRMINGHAM

ANALYST PROGRAMMER

Applications are invited from suitably experienced candidates (male or female) for the post of analyst/programmer in the Administrative Data Processing Unit. The Unit is based on an ICL 2903 installation and serves the administrative needs of the University, e.g. financial and management accounting, staff and student records. The Analyst Programmer reports through the Systems Analyst to the Data Processing Manager. Applicants must have considerable programming experience in COBOL and have some recent involvement in systems design. The successful candidate will initially be responsible for a sub system of financial accounts and reports system currently under development. Salary will be in accordance with other Related IA scale £3883 to £5555 per annum. Application forms available from Mr. A. G. Ross, Staffing Department, The University of Aston in Birmingham, Gosta Green, Birmingham B4 7ET, quoting reference Number 0/061/CW.

CLASSIFIED COPY

All classified copy should reach our offices no later than 5 30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday.

Ring Ian Carter for further details on 01-261 8016

ASSISTANT TO COMPUTER OPERATING SUPERVISOR

c. £4000

Due to expansion a position has arisen in the In-House Computer Department of our new H.Q. building administration offices for an experienced Computer Operator to assist the Computer Operating Supervisor.

The successful applicant, aged 22 or over will have had one year's disk experience, preferably including NIXDORF equipment and will have a responsible outlook to his/her work.

Working in an installation including NIXDORF PDP11 and DATAPOINT Equipment, the main function will be to correctly process daily work schedule as supplied.

Basic hours of duty will be from 12 noon to 8 p.m. Monday to Friday which will require an ability to work on own initiative.

As well as a good starting salary we offer excellent working conditions, pension, life assurance, discount schemes, an excellent subsidised staff restaurant and a planned first class social club.

For application form please apply Mrs. D. Parker
CHARRINGTON & COMPANY LIMITED
Anchor House
Mile End Road, London, E1 4BL
Telephone: 01-790 1860

Charrington

TEMPORARY COMPUTER PROGRAMMER

Up to £5,253 p.a. (full-time)

Experienced programmer with practical knowledge of PLAN COBOL and I.C.L. Software, is required (preferably full-time) to cover approximately one year's absence on maternity leave, for our I.C.L. 2903 28K computer with discs, tapes and on-line enquiry systems.

Write to the Personnel Officer, Manor House, Turners Hill, Cheshunt, Herts., EN8 8LE for application forms to be returned by 21st September, 1978.

BOROUGH OF BROXBOURNE

Analyst/Programmer

Real-Time Applications

This position offers you the chance to be involved in the introduction of on-line systems from the very start. Located in Leicester this independent brewery is expanding its varied computer applications and you will be a key figure in their development.

Probably aged in your mid-20's you should have worthwhile Cobol Programming experience on 1900/2900 machines. Real-time experience is highly desirable as is experience of implementing on-line systems, preferably on a 2903/4. The conditions of employment are excellent and the department being only a small one at present will give you every chance to be widely involved in its activities. Your salary will be related to relevant experience but could range from c £4,500 to c £6,000.

Contact: Christine Phillips, PER
177 Charles Street, Leicester
Tel: (0533) 538321

PER Professional & Executive Recruitment

Applications from both men and women are welcome.

IBM OPERATOR

TARGET EARNINGS c £6,500 +

C. & A.S., a West End Computer Bureau, require a high calibre Operator who wants to be part of an efficient, energetic team.

The Operator we want should be looking towards a career at the 'sharp-end' of D.P. with technical, client and people involvement.

- ★ Basic salary inc. S/A up to £4,500 p.a.
- ★ Overtime c £2,000 p.a.
- ★ 3 shift system Monday to Friday.
- ★ Season Ticket Loans.
- ★ Profit Sharing.

If you have 12-18 months' IBM DOS, good technical knowledge and want to progress, contact CAROL McGOVERN on 01-836 6775.

Computer Personnel International

Computing Services Association

110 St Martin's Lane, London WC2N 4BH 01 836 6775

THE WALLS MEAT COMPANY LTD.

(A member of the Unilever Group of Companies)

OPERATIONS MANAGER

to £6,400

Applications are invited for the above position. Requirements include knowledge of OS JCL, staff supervisory experience and a general understanding of how the operations function interacts within the computer department.

Duties include management of the terminal operations team, ensuring that live applications run to schedule, and control of application packages. In addition, a significant degree of user contact is anticipated regarding operations systems and ad hoc requirements.

This position would appeal to people wishing to develop their career within operations and who would welcome a broad involvement in the department's activities.

Current computer systems are run via a network of remote batch terminals linked to IBM/ITEL mainframes at the Group's computer centre.

Facilities include; staff shop; canteen, sports and social club.

Write giving brief details of experience, age, etc., to:

Mr. B. E. Oakley, Computer Services Manager
The Walls Meat Co. Ltd.
Bridge Road, Southall, Middlesex UB2 4AD

FOR CLASSIFIED ADVERTISEMENTS IN COMPUTER WEEKLY

Ring Eddie Farrell or Mark Williams on 01-261 8028 01-261 8019

COMPUTER ENGINEERS U.K. — O.S.

Field/Site/Support
All systems go:
£4,500-£14,000 p.a.

- ★ stand by
- ★ shift
- ★ overtime (according to post) car or allowance

E. S. STACK ASSOCIATES
Recruitment Consultants

OS CONVERSION AMSTERDAM

£250 p.w.

We have an urgent requirement for operations staff to assist with an IBM 370 DOS to OS systems conversion. Applicants must have a thorough knowledge of OS VS1, JCL, and Utilities.

Conversion experience will be preferred. Successful applicants will help to train the clients staff.

Salary will be in the range of £200-£250 p.w. Long contracts will be offered.

Please telephone Denise Rees at:
KEY OPERATIONS ASSISTANCE LTD
4 Half Moon Street, London, W.1
01-493 5737

Software Support Programmers

£5000 to £7500 Neg

One of the most important aspects in the development of any new hardware product is the provision of comprehensive hardware testing procedures, and particular attention is being paid to the software packages which will handle these testing and performance routines. Every effort will be made to develop software which will run automatically, including control of its own diagnostic and error-handling routines. Close liaison with engineers will play a large part in these developments, so, ideally, experience should include an appreciation of hardware, possibly from an engineering background.

A minimum of two years low-level programming experience will be required, although applicants should also have an appreciation of one high level language, since this could well be useful in terms of future development.

It is expected that successful candidates will earn not less than £5000 per annum, and salaries will be negotiable up to approximately £7500 per annum.

Although the final product will be based upon micro – processors, much of the vital development work is being done on mainframe computers, a powerful IBM system comprising 370/148 and 158 machines, which are due to be upgraded next year to include an IBM 3031 system.

Preferably educated to Degree standard, and with access to at least two years' programming experience in either PL1, COBOL or FORTRAN, ideal applicants would also have had some experience in either Real-time or mini/micro-processors, and would welcome an opportunity to use this knowledge in an unusual and exciting way.

The project involves creating high-level programmes which themselves will be used for the automatic production of both electronic switching and operational micro-processing software, as well as for the development of installation test programmes. The work is of an exacting and highly stimulating nature where satisfaction is guaranteed, and in which expression of your own ideas is the norm.

Situated in London's Green Belt, and with a significant lead in the expanding Telecommunications field, our client is currently at the forefront in developing micro-processor based private telephone exchanges which will broach new ground in many areas. Facilities previously unavailable will be offered, many as standard features, with the options of flexibility and expansion built in. The micro-processing techniques involved require the expertise of programmers in both high and low level programming languages, and in areas as diverse as Real Time Communications and Hardware Testing.

Real-time Communications Programmer

£5000 to £7500 Neg

Being the largest section involved in the Private Telephone Exchange project, it is only natural that the Real-time Communications team should have both the greatest need of expertise and the most to offer in return.

There are vacancies for several programmers with a minimum of around two years' experience in either ALGOL, FORTRAN, CORAL or ASSEMBLER – Level languages. Ideally, experience should have been gained in a Telecommunications environment but we would also like to hear from people with experience of either traffic or process control, or from an aerospace or engineering environment; however if your work has not been in any of these disciplines don't exclude yourself – this is a team venture in which personality and potential are every bit as important as experience. Responsibility will come quickly to successful applicants and, with a clearly defined and well planned career structure, so will promotion to those of real ability. Also, since this section takes responsibility for software development in the whole of Europe and the U.K, opportunities for overseas travel may be expected to arise from time to time.

Datascene Recruitment Ltd
Sceptre House
169-173 Regent Street
London W1R 7FB

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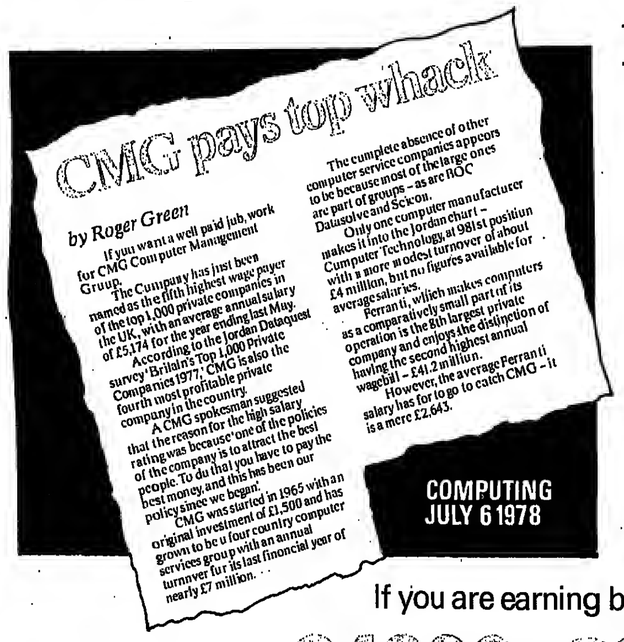
01-439 7871
24 hour answer phone

Analyst/ Programmers

Increase your earnings and secure your future with CMG!



CMG pays top whack

by Roger Green

If you want a well paid job, work for CMG Computer Management Group.

The Company has just been named as the fifth highest wage payer of the top 1,000 private companies in the UK, with an average annual salary of £5,174 for the year ending last May.

According to the Jordan Dataquest survey 'Britain's Top 1,000 Private Companies 1977', CMG is also the fourth most profitable private company in the country.

A CMG spokesman suggested that the reason for the high salary rating was because 'one of the policies of the company is to attract the best people. To do that you have to pay the best money, and this has been our policy since we began.'

CMG was started in 1965 with an original investment of £1,500 and has grown to be a four country computer services group with an annual turnover for its last financial year of nearly £7 million.

The complete absence of other computer service companies appears to be because most of the large ones are part of groups – as are ROC Datasolve and Scicon.

Only one computer manufacturer makes it into the Jordan chart – Computer Technology, at 981st position with a more modest turnover of about £4 million, but no figures available for average salaries.

Ferranti, which makes computers as a comparatively small part of its operation is the 8th largest private company and enjoys the distinction of having the second highest annual wagebill – £41.2 million.

However, the average Ferranti salary has for to go to catch CMG – it is a mere £2,643.

COMPUTING JULY 6 1978

PLUS

- ✻ Free Life Assurance & Pension Plan
- ✻ BUPA Family Cover
- ✻ 21-26 days annual holiday
- ✻ Profit sharing
- ✻ Holiday commitments honoured
- ✻ Removal expenses paid

Experienced computer professionals are required at all levels within CMG.

If you are earning between

£4000 – £12000

and want to develop your career with a company committed to growth, complete the attached application form and send it to one of the CMG Subsidiaries shown below.

Jane Leiper,
CMG Computer Management Group (Middlesex) Ltd.,
Westway House, 320 Ruislip Road East,
Greenford, Middlesex UB6 9BW
Tel: 01-578 4563

Janet Stirling,
CMG (Scotland) Ltd.,
Highland House, 58 Waterloo Street,
Glasgow G2 7DA. Tel: 041-221 8193/6

Judy Wilson,
CMG (Southern) Ltd.,
Sunley House, Bedford Park,
Croydon CR0 2AP. Tel: 01-686 8251

Janet Gothard,
CMG (West End) Ltd.,
Sunley House, Bedford Park,
Croydon CR0 2AP. Tel: 01-686 8251
(TO BE RELOCATED IN LONDON)

Colin Smith,
CMG (City of London) Ltd.,
'Eastgate' 73 Leman Street,
London E1 8EY. Tel: 01-481 3881

CMG

London · Amsterdam · Frankfurt
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Your success story starts here:-

PERSONAL DETAILS CONFIDENTIAL

(Please print)
SURNAME FIRST NAMES

ADDRESS

TELEPHONE Nos. HOME OFFICE/CONTACT DATE OF BIRTH

MARITAL STATUS NATIONALITY DO YOU HAVE A CURRENT DRIVING LICENCE? PASSPORT?

DO YOU OWN A CAR? ARE YOU PREPARED TO TRAVEL FOR SHORT PERIODS UK? ABROAD?

DESCRIBE THE APPOINTMENT YOU NOW SEEK:

DETAILS OF EDUCATION

SCHOOL CAREER EXAMINATION RESULTS (subjects and dates)

HIGHER EDUCATION EXAMINATION RESULTS (courses and dates)

CAREER HISTORY

PRESENT OR MOST RECENT EMPLOYMENT

NAME OF COMPANY

JOINING DATE JOINING SALARY £ CURRENT SALARY £

POSITIONS HELD (approx.dates) and DUTIES SPECIFYING COMPUTERS USED AND AREAS OF BUSINESS KNOWLEDGE:

PREVIOUS EMPLOYMENT

NAME OF COMPANY

JOINING DATE JOINING SALARY £ CURRENT SALARY £

POSITIONS HELD (approx.dates) and DUTIES SPECIFYING COMPUTERS USED AND AREAS OF BUSINESS KNOWLEDGE:

PREVIOUS EMPLOYMENT

NAME OF COMPANY

JOINING DATE JOINING SALARY £ CURRENT SALARY £

POSITIONS HELD (approx.dates) and DUTIES SPECIFYING COMPUTERS USED AND AREAS OF BUSINESS KNOWLEDGE:

OTHER INFORMATION –

LEISURE, COMMUNITY ACTIVITIES, etc:

ANYTHING ELSE YOU WOULD LIKE TO ADD:

SIGNATURE DATE

CMG

London · Amsterdam · Frankfurt
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occ computer personnel limited

Euston

Senior Systems Analyst

c £7,500

Large-scale accounting systems

The computer serves the needs of a major public body which handles significant amounts of money, and the accounting systems handle a large volume of accounts and transactions. However, the department is still young and there are plans to design and implement further large systems. New hardware will be required in the future and modern techniques (data base and on line systems) will be used. A Senior Analyst is required to help with the investigation, design, specification and implementation of new systems. The Analyst will have considerable autonomy and must be stable, self-motivated and mature to allow him to operate at the most senior levels. Experience of accounting systems, databases and on-line techniques would be useful. The hardware background is unimportant. Prospects for career development are excellent and the terms of employment are very good. They include relocation expenses, index linked pension scheme, season ticket loans, etc.

Ref: 741/CW/Neville John.

London Bridge

Senior Systems Analyst

to £7,000

Senior Programmer

c £5,500

New 2904: development of accounting system

A leading manufacturing and publishing group needs a Senior Analyst to deal with an increased workload. The ICL 1902A is to be replaced by a 2904 later this month. The analyst will develop a major accounting package and will lead a small but progressive team of programmers working on both batch and on-line commercial systems. The prospect of project leadership is likely in the near future. Candidates should have at least three years' commercial systems experience and a Cobol programming background. A Senior Programmer with at least two years' Cobol experience, any hardware, is also required. Benefits include flexible working hours, a subsidised restaurant, season ticket loans, staff discounts, and for the analyst a car loan scheme.

Ref: 743/CW/Marian Tabone.

Texas USA

Senior Programmers
Programmers

$ negotiable

H6000 Series COBOL

A number of opportunities currently exist for COBOL programmers with Honeywell 6000 series experience to work on contract in the USA. Application areas, utilising IDS, include Accounting and Materials Management. Candidates for the senior positions should have a total of 6 years' DP experience including around 2 years on large Honeywell hardware, preferably together with some system and program design experience in the commercial accounting area. Programmers should have around 4 years' experience including some time spent on Honeywell equipment. In both cases experience of IDS, TDS, TSS or GMAP could be very useful. Employment will be offered on a renegotiable short or long term contract basis and fringe benefits include paid air fares, sickness scheme, bonus, tax concessions, relocation expenses, etc. Working conditions are excellent. Offices are air-conditioned and the general environment is relaxed and friendly with a wide variety of sports and recreational facilities available in the area.

Ref: 390P/CW/Roger Allington.

Middle East

Analyst Programmers

c £14,000 tax-free + benefits

New department: IBM 370/115: RPGII: CICS: DOS/VS

Analyst programmers are required for a new computer department being established at a leading motor distributor in Saudi Arabia, which is due to take delivery of an IBM 370/115 in March, 1979. The systems will initially be a mixture of batch and on-line, running under CICS and DOS/VS and written in RPGII. Successful candidates will ideally have at least 18 months' practical experience of CICS, DOS/VS and RPG. There will be a high degree of user involvement and the positions will suit self-starters. Experience of the distributive side of the motor trade would be an added advantage. These positions are on bachelor status, enjoying the following benefits: 30 days' leave and 15 days' public holidays per annum. Free furnished accommodation of good standard with free electricity and water. Free medical treatment and company car.

Ref: 739/CW/Marian Tabone.

To apply for any of the above positions or for further information, please telephone the Consultant concerned during working hours on 01-242 9356, or write to the above address.

If it would be more convenient to telephone in the evening, or weekend, the telephone numbers are: Roger Allington — Barkhamstad (04427) 2299, Neville John — Farnborough (66) 52880, Marian Tabone — 01-555 5568.

Members of Computing Services Association

EXCELLENT OPPORTUNITIES FOR CONTRACT STAFF

In line with current expansion plans we will be pleased to hear from programmers, analysts and consultants of professional disposition with a solid background in any of the following disciplines:

MARK IV **FORTRAN**
COBOL **BASIC**
PL/1 **RPG**
BAL

and any DATABASE or TP MONITORS

Forthcoming internal projects include developments on in-house equipment. Current external projects cover U.K., Europe, U.S.A. and the Middle East.

Please telephone or send career details to:

MARGARET DRISCOLL
TANGENT COMPUTER SERVICES
BROOK HOUSE, 4 EASTERN ROAD
ROMFORD, ESSEX RM1 3PJ

TEL. ROMFORD 0708-44181/2

Top contract fees

tangent COMPUTER SERVICES

SYSTEMS ANALYST

Expanding Canadian construction company requires a systems analyst with flair and resourcefulness to be personal assistant to the data processing manager.

Applicants must have a degree or equivalent and from 3-5 years' experience in business systems and programming. Interviews will be held in the U.K.

The configuration is a P.D.P. 11/70 using R.S.T.S./E. with programming in Basic-Plus. Existing on-line applications include estimating, costing and payroll. The successful candidate will design an on-line sales/invoicing system initially, then moving on to estimating and accounting. The position involves considerable independence and responsibility and will require some travelling to our Calgary and Vancouver branches. The job is located in our new premises in Edmonton.

Starting salary is from $19,000-$22,000 depending on qualifications.

JK

Write to:
Data Processing Manager
J. K. Campbell & Associates Ltd,
1104-107 Avenue, Edmonton
Alberta T5H 0X8, Canada

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FOR ALL THE BEST PERMANENT OR CONTRACT JOBS

E.g.

IBM DOS CICS £5500+
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JUNIOR OPERATORS To £4700

Any machine experience

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RING DEREK ASHLEY or GEOFF CARR 01-402 9355

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AP3/4 £4017 to £4917 (including supplement and London Weighting)

Are you a Shift Leader, Senior Operator or Senior Control Clerk with at least 2 years experience of IBM DOS/VS POWER/VS and currently looking for career advancement in a challenging non-shift role? Then you may be interested in joining our young and enthusiastic operating team, working in pleasant surroundings at Bexleyheath on a recently installed 1 megabyte IBM 370/138 using DOS/VS POWER/VS and CICS with an extensive communication network and Raytheon R300 data entry equipment.

You will be a member of a small team responsible for providing a general operating support service to the installation and its users, involving the set up and control of all new work from the final stages of system development through to live processing, the preparation of operating procedures and customer liaison functions.

For further details or an application form please write or telephone (01-303 7777 Ext. 782), D. Jarvis, Operations Manager, Data Processing Department, 9 Brompton Road, Bexleyheath, Kent DA7 2EZ.

Closing date [illegible]

Previous applicants [illegible]

Bexley London Borough

FRANKFURT — BRUSSELS — LONDON — PARIS

PROGRAMMER

C £5,500 + EXPENSES

The world's largest international airfreight forwarder requires two experienced COBOL programmers to help install minis at its European locations. Based in Sunbury-on-Thames, the work will involve extensive travelling, up to 50% of the time will be spent in Europe, during which time generous overseas expenses will be paid.

Direct experience on minis is not essential as specific training will be given. More important is self-reliance and initiative to successfully work and liaise with our European user departments. The successful applicant will be in a strong position to be closely involved with an expanding department moving towards extensive communications and distributed processing facilities.

If interested write to

JEFF MALLINDER
Air Express International Agency Inc.
51 Staines Road West
Sunbury-on-Thames
Middlesex, TW16 7AH

or telephone Sunbury (09327) 86312 / Guildford [illegible] 71807 (evenings)

CAREER DEVELOPMENT FOR ANALYSTS AND PROGRAMMERS

Leicester

There are a number of vacancies at our Leicester based client for professional data processing staff. The installation employs the latest ICL hardware and current developments include database and on-line systems covering a diverse range of applications. Distributed processing applications using mini computers are also being developed.

Applications are invited for the following positions:-

Analysts c.£5500

Reporting to a project leader these positions offer good experience in development of major systems.

Candidates should have one or two years systems analysis experience and preferably a background in programming.

(c/78084)

Junior Analysts c.£4700

These vacancies are within project teams and can offer candidates excellent prospects as 'first time' analysts.

Candidates should have about three years relevant dp experience preferably including some supervisory role.

(c/78085)

Senior Programmers c.£5500

These positions involve responsibility for leading a small programming team developing new systems in a project environment. The positions report to the chief programmer.

Candidates should have about three years COBOL experience in a major installation.

(c/78083)

Telephone or write giving brief career details, quoting appropriate reference, to Ivor Norton.
OR ALTERNATIVELY INFORMAL INTERVIEWS WILL BE HELD AT THE CENTRE HOTEL, LEICESTER FROM 9.00 a.m. UNTIL 9.00 p.m. ON THURSDAY 21st SEPTEMBER 1978. YOU CAN MAKE A PRIOR APPOINTMENT FOR THIS DATE OR ALTERNATIVELY DROP IN AND SEE US WHEN CONVENIENT.

Ivor Norton Management Services Ltd
Recruitment Consulting Division
P.O. Box 63, Copthall Tower House, Harrogate HG1 1TS. Tel: Harrogate 66628.

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to £16K

TEAM WORK IN THE SOUTH OF ENGLAND

Focus, consultants to the computer profession, are looking for

PROGRAMMERS

and a

TEAM LEADER

for a one-year contract.

You will be working together as a team, but initially the entries of the various team members will be staggered over several months: the first programmer to start in October, 1978. The unit will gradually increase until it is completed by March, 1979.

To play your part as an essential member of the team, you will be expected to have experience in three or more of the following:
IMS, VMS, TSO, CICS, ASSEMBLER, PL/1 and FORTRAN.

If you have the skills we need, and would be happy working with a close-knit group of professionals based in the South, ring FOCUS COMPUTER SERVICES immediately on 01-487 5781.

CLASSIFIED COPY

All classified copy should reach our offices no later than 5.30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday.

Ring Ian Carter for further details on 01-261 8016

UNIVERSITY OF SURREY
Department of Mechanical Engineering

RESEARCH OFFICER

FOR THE ROBOTICS GROUP

Applicants are expected to hold either a University degree or HND and have knowledge and experience of microelectronics. The successful applicant will work in a research team developing industrial robots. Main duties will be in configuring and interfacing Intel microcomputers to the robot hardware and maintaining and updating the robot software. The successful applicant will be able to exploit fully ability and knowledge in developing new software in either assembler or a higher level language and will be able to engage in computer simulation work and control problems concerning robots.

The commencing salary will be £4386 per annum, on the Research & Analogous Staff Scale, Range IB.

The duration of the appointment is for 2 years.

It is hoped that the successful applicant will be able to commence duties on or before 1st November, 1978.

Further particulars of this post may be obtained from the Assistant Secretary (Personnel), University of Surrey, Guildford, Surrey GU2 5XH, or telephone Guildford 71281, Ext. 462, and to whom applications in the form of a curriculum vitae, including the names and addresses of two referees, should be submitted by: 16 October, 1978.

JUNIOR PROGRAMMERS

— £4.5K

A major bureau is looking for two junior programmers to join the customer support team.

The work would entail visiting customer sites and 'hand holding'. The ideal applicant would have 1-2 years experience in COBOL or FORTRAN. A company car is provided if required.

Phone: 01-942 9810

MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

IBM UPGRADE IN LONDON

COBOL & ASSEMBLER PROGRAMMERS

A SMALL DATA PROCESSING DEPARTMENT, IN CENTRAL LONDON, wishes to secure the services of three IBM PROGRAMMERS to assist with the development of mainly accounting applications and the implementation of a larger 370 to be installed in 1979. The Company is in a period of continued expansion, relying heavily on data processing systems to cope with the increase in demand for accurate accounting information.

TWO PROGRAMMERS, WITH AT LEAST 2 YEARS' IBM COBOL, are required to strengthen the systems and programming group currently engaged on several interesting projects. A knowledge of DOS/VS would be an advantage and the successful applicants will be expected to communicate with accountants and senior personnel alike. Salaries will be according to experience with a maximum of **£5,800** per annum.

A SYSTEMS PROGRAMMER, WHO IS SEEKING PROMOTION TO CHIEF PROGRAMMER, will initially be fully responsible for the operating system and all programming support. Candidates will have 4-5 years' IBM ASSEMBLER experience and a knowledge of COBOL will be especially helpful in securing the Chief Programmer position. Commencement salary will be up to **£6,500** per annum with an extra **£500** on promotion.

The Company offers a NON-CONTRIBUTORY PENSION SCHEME, LVs, 35 hour week and 4 weeks holiday. Being situated in Central London, it is easily accessible by all forms of transport from the Home Counties.

24-hour answering service
Please telephone for a confidential discussion or write to:
30 Fleet Street, London EC4Y 1AA
01-353 0981

GRUNDIG

IBM System 3-15B

Grundig International are the marketing subsidiary of Grundig AG, distributing quality electrical goods throughout the UK. We are undertaking a long-term project in which our conventional/computer-related systems will be streamlined, thus creating a coherent and flexible organisation to meet future market demands.

Programmer/Analyst
c. £6,000 p.a.

To strengthen our development team we have created a new position for an experienced RPG2 Programmer/Analyst. He or she will be responsible to the EDP Manager for the design and full implementation of this planned system which will include on-line inventory control/distribution and associated budgetary costing.

Senior Computer Operator
c. £5,250 + p.a.

In order to assist in the implementation we also have a vacancy for an experienced operator to control the daily processing requirements.
The successful candidates will have the initiative and self-motivation to develop the scope of the positions by introducing Company-wide systems in the area of data communications.
The excellent remuneration package will reflect the high level of contribution expected from the applicants.
To discuss your ambitions and prospects with us please telephone

The Personnel Officer,
Grundig International Limited,
Newlands Park,
Sydenham, S.E.26
Telephone: 01-659 2468

Computer Operator

SHIRLEY, SOLIHULL

The Region currently operates a 192K 1903T running under GEORGE 3, with two front end processors supporting a mixed batch/communications workload. A 2903 system is also installed. Future developments include the replacement of the 1903T with a large 2900 configuration.

Shift working is involved. Salary range including shift allowance £2,855-£4,499 per annum. A self-financing bonus scheme payable.

If you think you have the right level of experience to join a go-ahead team, please write, quoting vacancy number CW233/78MR giving details of age and experience to the Personnel Manager, Central Electricity Generating Board, Hasluck's Green Road, Shirley, Solihull, West Midlands, B90 4PD, by 21st September, 1978.

CENTRAL ELECTRICITY GENERATING BOARD
Midlands Region

Ludbrook

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An excellent opportunity exists within our expanding D.P. division, for a dynamic male or female, who is able to communicate at all levels, with confidence.
A minimum of 18 months D.P. experience, together with a pleasing personality, and ability to work under pressure is essential.
The rewards for self motivation are high. For further details, please phone in the strictest confidence.

P. BELL
LUDBROOK MANAGEMENT SERVICES
1 East Gates, Leicester
Telephone: Leicester (0533) 52314

PROGRESS & CONTROL ASSISTANT

Leicester — up to £4332

This is a key position in the Computer Operations area.

Progress and Control Assistants negotiate short-term work processing schedules with representatives from the departments using computer systems. They are responsible for preparing, submitting and progressing computer runs in line with these schedules to ensure that the required work deadlines are regularly met. They must maintain contact with both Computer Operating staff and the user representatives on the current work status. Additionally, they must make sure that the manual checks and controls built into each system are stringently enforced.

The successful men or women must be capable of establishing and maintaining good working relationships with other staff, possess a methodical approach to work and be prepared to work outside of normal hours to ensure work is completed satisfactorily.

Salary in a range rising to £4332 per annum.

Detailed applications, quoting reference number A.201 on both letter and envelope, to:
Senior Personnel Officer (Finance & General Services), Emgas, 0a Montfort Street, Leicester.

Closing date: 22nd September, 1978.

EMGAS

WEST WILTSHIRE DISTRICT COUNCIL

RPG 11 PROGRAMMER/ANALYST

SALARY £5,331 to £5,868 including all Supplements and Shift allowances

The Council operates an ICL 2903 computer with EDS 60s and a 7602 based communicating network providing a computer service throughout the authority.

The installation is operational between 7.30 am to 7 pm by means of two shifts, i.e. 7.30 am to 4 pm and 10.30 am to 7 pm.

The machine is due to be upgraded to 2904 in late summer and the Council wishes to appoint one experienced RPG11 Programmer wishing to gain experience in the analysis sphere. The person appointed will have at least eighteen months experience of RPG11, and a detailed knowledge of ICL 1900 to 2903 Software/Utilities will be regarded as equally important.

If you would like to discuss any aspect before submitting an application form, please contact D. BENFIELD, Computer Manager on Trowbridge (02214) 83111 ex. 121.

The West Wiltshire District Council area is situated in a pleasant rural location with easy access to the towns of BATH/BRISTOL and the M4/M5 motorways with reasonable house prices. Removal and lodging expenses can be provided in appropriate cases.

Application forms are available from Personnel Officer
WEST WILTSHIRE DISTRICT COUNCIL
BRADLEY ROAD, TROWBRIDGE, WILTSHIRE BA14 0RD
or by telephone
Trowbridge (02214-83111 ex. 119)
(Mrs. Tilley)
Closing date 21st September, 1978

PROJECT MANAGER

Large ICL 2900

SYSTEMS ANALYST

This Company is currently reviewing its Computer Hardware and expects to upgrade to the above system during 1979. A Project Manager is required to co-ordinate all aspects of the introduction of a Teleprocessing system and the new Machine.

A number of Manufacturing (Batch) Systems exist, and part of the project is to evaluate in what form these are transferred, and to liaise with Software houses to ensure the new system is available in an acceptable timescale.

Both the above positions are senior appointments and would expect to commend salaries in excess of £7,000 p.a.

A Company Car will be provided for the Project Manager.

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COMPUTER ANCILLARIES LIMITED

a subsidiary of a major international company, who market the successful range of MAEL Mini-Computers and Jacquard Systems require experienced personnel at all levels to continue our expansion programme in the Southern England.

The successful applicants, male or female, must be able to

* Repair Visual Display Unit based Mini/Micro Computer Systems.
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The Company provides

* High basic salary dependent upon experience.
* A Company Car.
* Free use of Company Car for private use.
* Relocation assistance if necessary.
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Telephone or write to:
Mr. B. McKendlish
Computer Ancillaries Ltd.
64 High Street
Egham, Surrey, TW20 2EY
EGHAM 6455

Computer Ancillaries Limited

DATA PROCESSING/ SYSTEMS MANAGER

Our client, a highly successful company operating a rapidly expanding number of retail outlets now seeks a Data Processing/Systems Professional

Reporting to the Financial Director the position is based at the Company's Headquarters in an attractive town north of London, where current facilities are based on an ICL 2903.

The demands of this job will require a subtle blend of technical know-how and management skills. The immediate priorities fall squarely on the operations side where there is a need to implement effective procedures for scheduling and running existing systems, particularly stock-control and payroll routines.

An ambitious corporate plan will provide exciting systems design opportunities and career development prospects which would be difficult to match.

The successful candidate will be in his or her 30s, possibly with a degree or equivalent on a related discipline, and preferred experience in an environment where central processing is carried out to remote operating units.

The company regards the remuneration package as negotiable around an indicator of £8,000 per annum.

Please apply in writing, giving all relevant details — all applications will be acknowledged and treated in the strictest confidence, to Box No. C.W.1981.

PROGRAMMERS
c £5,200 + mortgage + benefits

Join the computer department of a large American Bank in Central London developing Foreign Exchange and Loans/Deposit systems on their PDP 11/55s. When complete these systems will be implemented in their European branches.
Ideally candidates will be working for a financial organisation at the moment and have 2-3 years' programming experience using Basic, Cobol or Fortran, preferably on Minis although this is not essential.
You will receive excellent benefits including a subsidised mortgage, BUPA, Life Insurance, non contributory pension scheme, free lunches and profit sharing.
Worth considering? Then contact LINDA BENSTED on 01-836 6775.

Computer Personnel International
110 St Martin's Lane, London WC2N 4BH 01-836 6775

MANAGEMENT & EXECUTIVE SELECTION

telephone 01-637 9611

FOCUS ON ENGINEERING

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Continuing their expansion, the Department now require **Computer Engineers** to join their teams in the areas mentioned, maintaining computer or telemetry systems and their associated peripherals.

ABERDEEN: For land based systems in Aberdeen and the Shetlands. Applicants will also be required to work offshore occasionally, and if necessary, on a regular basis. The income package provided will be £6,000 + Offshore Allowances.

EDINBURGH: For land based systems throughout Scotland (except Aberdeen, etc.), with an income package of circa £4,200 + Allowances + Use of Company Car.

Extensive training on equipment will be given by the company and manufacturers, but a minimum HNC qualification must already be held by applicants.

Relocation expenses are available, as are many other company benefits.

To join this major force in Scotland — contact Peter Gorton!

MAINFRAME ABROAD

BELGIUM
ITALY
MIDDLE EAST (based London)

£10K + negotiable

If International Support appeals, and you have a detailed knowledge of IBM 370/165 or 370/168 or 360/65, then this company can offer you an exceptional future.

Send your C.V. directly to Peter Gorton or telephone for an application form. Further information will be available.

Suite 201/6 Albany House 324 Regent Street London W1R 5AA 01-637 9611

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Large Computer Systems — £4-8K package + Shift

Experienced and Trainee personnel are required for the site maintenance of installations in *Manchester, the Midlands, the West Country and Central London.*

Plug-Compatible Peripherals — £6-10K package + car

Experienced personnel are required for field maintenance of installations in *Lancashire & W. Yorks, the Midlands and Greater London.*

Small Computer Systems

Experienced and trainee personnel are also required for 'mobile maintenance' positions in the *Greater London Area.* Details available on request.

Excellent benefits are also provided, extra to the 'packages' mentioned above.

So, if you want variety and a technically demanding environment plus guaranteed career (and salary) progression geared to merit, then apply now! — Contact Peter Gorton.

FIELD SERVICE ENGS.

Outer & C London — to £8K package

Join the company that invented the mini computer and who are now world leaders in its manufacture and marketing.

They are a young, successful and progressive organisation, a rich mix of talents that consistently produce exceptional computer systems that sell widely.

You will be joining a professional computer service team working on mini computers and mainframes, and will receive a thorough training in both hardware and software.

Anyone with 2-3 years' relevant experience, or an HNC/HND in Electrical/Electronic Engineering plus some experience, is eligible for these positions.

Basic salaries will be not less than £5,000 p.a.

Additionally: For Central London they provide allowances of £2,000 p.a. plus Call Out, Standby and/or Shift Payments where appropriate.
For Outer London they provide a £400 London Allowance, a Company Car or Car Allowance, and a good possibility of working from home.

Free Life Assurance is included in the comprehensive benefits package, one you would expect from an expanding international company.

Don't miss this chance to join this successful and progressive team — contact Peter Gorton Now!

MANAGEMENT & EXECUTIVE SELECTION

BUYER
Printed Circuit Cards/ Flexible Circuits

Greenock, situated in attractive surroundings on the West Coast of Scotland, is the location of IBM's expanding manufacturing plant where we produce some of the most advanced computer products in the world. We're now looking for an experienced man or woman to join our procurement function.

You will be responsible for the handling of high volume sub-contract activities associated with the assembly and test of rigid high density printed circuit cards and the purchase of flexible circuits. This will involve the establishment of highly competitive sources for these commodities, so a knowledge of EEC and Far East market-places would be an advantage. As a result, extensive travel both in the UK and overseas will be necessary.

You should be educated to HNC/Degree level in Electrical/Electronic Engineering or equivalent, and have a minimum of 5 years' experience in major contract negotiations, preferably in a high volume electronics industry. Commercial qualifications of a similar level will also be considered.

In return, we offer a competitive starting salary backed by a substantial range of benefits, which we believe to be among the best in industry today. Relocation assistance will be provided where appropriate.

Please write with full details to: Ian Wilson, Personnel Selection, IBM United Kingdom Limited, PO Box 30, Spango Valley, Greenock PA16 0AH or telephone him on Gourock 33700 Ext. 4060 for an application form. Please quote reference CW/936492.

IBM

Admiralty Marine Technology Establishment
Teddington

Computer Operations Manager

The Computer Section of AMTE renders full support to the research programmes and provides an important service to some 20 Defence Establishments and Government Authorities via a terminal system. An ICL 2970 computer operating under the VME/B system will be in use.

The Operations Manager will be responsible for the planning, organisation and control of the installation to ensure efficient and economic operating and prompt and accurate service to the customer. This will involve close liaison with computer engineers and systems programmers for the continual development of the operating system software. The successful candidate will also take responsibility for operating training, the preparation of shift rotas, computer room security, and the keeping of accounts.

Candidates (aged at least 30) should normally have a degree, or equivalent qualification, in an appropriate, scientific/mathematical subject and must have recent experience of managing a computer system. Candidates without the prescribed qualification, but who can produce evidence of high professional attainment may be considered.

Appointment as Senior Scientific Officer (£5425-£7175) with starting salary according to qualifications and experience. Non-contributory pension scheme.

For further details and an application form (to be returned by 6th October, 1978), write to Civil Service Commission, Alencon Link, Basingstoke, Hants RG21 1JB, telephone Basingstoke (0256) 68551 (answering service operates outside office hours. *Please quote ref. S/9906.*

SALES EXECUTIVES
(MANAGEMENT POTENTIAL)

A very well known British Company is expanding rapidly throughout the UK. They have become even more diversified with the supplying of Mini Computer Systems, Terminals, Distributed Processing Systems, Turnkey Package Systems and Business Systems.

The above have been successfully marketed for the past 18 months. Expansion time is now here.

New branch offices are being opened, so this is a golden opportunity for experienced sales executives in the following areas:

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- Glasgow
- Leeds
- Birmingham
- London

For your efforts you will earn c. £13,000 + Car and further your career towards **management**.

TELEPHONE:
Bill Taylor 01-836 6087

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Computer Personnel Consultants
107 Jermyn Street, London SW1Y 6EE

BARNARD DAVIES & WARD LTD

NEWCASTLE UPON TYNE POLYTECHNIC
Department of Mathematics, Statistics and Computing

LECTURER II IN COMPUTING

Applications are invited for the above post. The person appointed will join a group of staff concerned with the teaching of Computing throughout the Polytechnic.

Applicants should be well qualified in computing and have teaching, research and/or industrial experience. Candidates will be expected to have a special interest in the application of computing to business, commerce and/or finance and be prepared to undertake or supervise research.

Burnham F.E., Lecturer II £4101-£6558 p.a.

For further particulars and an application form, returnable by Thursday, 28th September, 1978, please send a stamped addressed foolscap envelope to the Staffing Officer, Newcastle upon Tyne Polytechnic, Ellison Building, Ellison Place, Newcastle upon Tyne NE1 8ST

UNIVERSITY OF BIRMINGHAM
FACULTY OF COMMERCE AND SOCIAL SCIENCE
READVERTISEMENT

Research Fellow (Range 1A) in Computing

Applications are invited for an S.S.R.C. supported Research Fellowship (Range 1A) in computing in the Department of Economics.

The Research Fellow will be concerned with the development of software including programmes for algebraic manipulation on a CDC 7600. Candidates should, therefore, be well qualified in computer science and have a good knowledge of numerical analysis.

The appointment will be for 16 months from December 1, 1978. Salary on the first five points of the Research Fellow Scale (£3883-£4882 plus superannuation).

Further particulars and application form from the Assistant Registrar (Commerce), University of Birmingham, P.O. Box 363, Birmingham B15 2TT, to whom the form, naming three referees, should be returned by Friday, October 6, 1978, quoting reference C/201R/FF.

SOFTWARE MANAGER/ BURROUGHS LARGE SYSTEMS

We require, to lead a Technical Support Team, an experienced Software Programming Manager. The successful applicant will have an in-depth knowledge of Burroughs Large Systems Software, DMS II, COBOL and ALGOL.

The position involves the management of a small team of highly technical staff dealing with the provision and maintenance of software, the recommendation of hardware subject to examination and evaluation. The provision of a training function within the Management Services Department for languages and techniques and the provision and maintenance of standards in computing in conjunction with systems development.

Circa £7,300 p.a. Plus Profit Sharing and many fringe benefits

Write to:

Peter Thomas, Personnel Department
ICI Plant Protection Division
Fernhurst, Haslemere, Surrey

ICI Plant Protection Division

AUSTRALIA CALLING

For details of employment in Australia for experienced E.D.P./Computer Personnel write, enclosing detailed C/V. to

PROFESSIONAL STAFF
388 Bourke Street, Melbourne, Vic., 3000, Australia.

COLCHESTER BOROUGH COUNCIL
Borough Treasurer's Department
Re-advertisement

PROGRAMMER/ ANALYST

AP.3/4 £3,420-£4,320 plus non-enhanceable supplement of £312 per annum.

Applications are invited for the above post in the Computer Section. The Council has recently replaced ICL 1900 equipment with ICL 2903, EDS 60s, M.T.U.s and DDEs. A comprehensive range of existing systems will now be redesigned to make full use of the new equipment and some new systems introduced (including terminal facilities where appropriate).

This vacancy has arisen through internal promotion of the present holder. Applicants should have experience of programming in COBOL and disc-based systems. A knowledge of either ICL 2903, PLAN or Local Government would be an added advantage.

The usual Local Government conditions of service apply to this post. Housing accommodation for up to two years and generous relocation expenses are available in appropriate cases. A system of flexible working hours is in operation.

Application forms are obtainable from the Borough Treasurer, Rowan Chambers, St Isaac's Walk, Colchester (Telephone No. 76071 Ext. 219) to whom they should be returned not later than 29th September, 1978. Previous applicants will be considered and need not re-apply.

Programmer

Wilmot Breeden Limited, an important supplier of motor vehicle components, is developing its data processing facilities on a new Honeywell 62 unit. The company operates on-line inventory monitoring and batch programmes in COBOL for production and financial control.

We are seeking a mature, well motivated COBOL Programmer aged 25 or over, with four years' varied experience, who wants to develop his/her skills working through a wide range of applications.

We offer a salary negotiable up to £4780, 34 days' holiday in total, subsidised canteen, contributory pension scheme and other benefits.

Applications in writing giving details of training, experience and current salary should be sent to N. C. Austin, Personnel Officer (Stntt), Wilmot Breeden Limited, Fordhouse Lane, Stirchley, Birmingham B30 3BW.

Wilmot Breeden

Re-Advertisement
UNIVERSITY OF EXETER
FACULTY OF SOCIAL STUDIES

PROGRAMMER III

The Data Processing Unit in the Faculty of Social Studies requires a Programmer III to join a team of four programmers. The Unit has an S.J.E. link to the University ICL 4-72 computer.

The work is mainly of a statistical nature in the creation and analysis of data banks and preference will be given to applicants with experience of programming in a high-level language and the use of statistical packages. Applicants must have a university degree in a relevant subject but previous computing experience is not necessary as training will be given.

Salary according to qualifications and experience will be within the range [illegible].

Letters of application stating the names of two referees should be sent to Miss Doreen Watson, Administrative Assistant (Appointments), Northcote House, Queen's Drive, Exeter, by 21 September, 1978. Please quote reference [illegible].

UNIVERSITY OF NEWCASTLE UPON TYNE
Computing Laboratory

RESEARCH IN COMPUTER ARCHITECTURE AND OPERATING SYSTEMS

Applications are invited for Research Associate posts on a project concerning the reliability and integrity of distributed computing systems. This Science Research Council sponsored project is a successor to earlier work on the design of highly reliable computing systems, and will involve both theoretical studies and the implementation of prototype systems. Candidates should possess a Ph.D. degree, or equivalent experience in one or more of the following areas: Operating Systems, Compilers, Parallel and Distributed Systems. Appointments will be for up to four years and are available immediately. The salary will be at a point on the University lecturer's scale £3883-£6558. Applicants should forward a brief resume (three copies) together with the names and addresses of three persons to whom reference may be made to Professor B. Randell, Computing Laboratory, The University, Newcastle upon Tyne NE1 7RU, not later than 30th October 1978.

PROGRAMMER/ SYSTEMS PROGRAMMER

Ewell

£4,425-£4,812

For North East Surrey College of Technology. To assist the Computer Manager in providing the College with a Computer service in a wide range of system and application areas. This is an ideal opportunity to gain valuable experience in the use of a modern timesharing minicomputer system (Varian V76). BASIC, FORTRAN and TASC are available ON-LINE. In addition we are currently investigating the use of micro-processor systems in the education field.

Candidates should be qualified to at least A-level standard and should have several years' experience in computing including use of high and low-level [illegible] some knowledge of hardware [illegible].

Opportunities for further training are also available.

Application form from Chief Administrative Officer, North East Surrey College of Technology, Reigate Road, Ewell, Epsom, Surrey, KT17 3DS. Please quote reference: CAO/59/23.

SURREY COUNTY COUNCIL

CONTRACTORS
Up to £250 p.w. with E.M.S.

- ANALYSTS COMMERCIAL—NORTH-WEST
- ANALYSTS BANKING—LONDON
- IDS DESIGNERS—SURREY
- PROGRAMMERS HONEYWELL L66—COBOL—ENTIRE U.K.
- PROGRAMMERS HONEYWELL IDS—NORTH-WEST, MIDLANDS & SURREY
- PROGRAMMERS—MINI SYSTEMS—SOUTH MIDLANDS
- PROGRAMMERS—IBM CICS—MIDLANDS
- PROGRAMMERS—FORTRAN—NORTH-WEST
- PROGRAMMERS—IBM DOS/OS COBOL—LONDON
- PROGRAMMERS—PL/1—LONDON AND SOUTH
- PROGRAMMERS—ASSEMBLER—MIDLANDS
- ANALYSTS AND PROGRAMMERS—LOCAL AUTHORITY EXPERIENCE—U.K.
- PROGRAMMERS—COBOL BURROUGHS—SOUTHAMPTON
- PROGRAMMERS—HONEYWELL COBOL—DURHAM
- PROGRAMMERS—HONEYWELL COBOL—LONDON

NORTH WEST — ANALYSTS
Packages to £7,500 + O/T pay

The E.M.S. consulting group has a large quantity of vacancies for additional Analysts to handle expanding systems requirements in the North West region. Candidates should have a minimum of 2 years' systems experience and preferably although not essentially, past programming experience. Our major current requirements are for both Analysts and Senior Analysts to work on commercial systems development. Projects will include Ledger Systems, Stock Control, Warehousing and Distribution, Chain Store Systems, Database and Network Systems. Ability to work in conjunction with client team members and maintain a high professional standard will be important. Relocation assistance will be paid where appropriate. Telephone our Birmingham Data Centre urgently for early interviews on 021-454 7908 (Don Philp). Please complete the attached application form, in addition, and return to Newcastle, Staffs today. Over 20 current vacancies are available at very attractive salary levels.

ANALYSTS & PROGRAMMERS
BIRMINGHAM **To £6,000**

We currently have a large volume of vacancies throughout the Birmingham and West Midlands regions, including a wide variety of new jobs in the rapidly expanding E.M.S. Data Centre.

COBOL and ASSEMBLER programmers should complete our application forms today as an urgent priority. We have an unparalleled range of vacancies available. In addition to hundreds of client vacancies, E.M.S. also have interesting and challenging vacancies within our Turnkey Systems Division for candidates seeking the opportunities of constantly working on new development projects within a modern, attractively furnished Data Centre. Interviews are held daily at the Data Centre — Why not come along to discuss your career development projects within the Midlands? E.M.S., as the largest recruitment consultancy in the country, has opportunities available for all D.P. staff which are unrivalled throughout the Midlands. Equally, please do not hesitate to complete and return today the attached application form. For only a few minutes initial correspondence the lucrative career opportunities will be forthcoming for you make your time worth the investment.

Consultant: Don Philp/Damien Handslip.

TOP SALESMEN
10K-20K (and it is earnable!!)

E.M.S. is planning substantial further development of both our Consultancy and Turnkey Systems Divisions during the coming months. Our Consultancy activities extend across all mainframe ranges and encompass a wide range of industrial/commercial organisations. Applications must, therefore, present as high level Business Analysts capable of rapidly assessing clients' requirements and proposing relevant solutions where appropriate or identifying the relevant consulting expertise required in either systems or programming and providing the necessary staff from E.M.S. resources. A vast potential market exists for salesmen marketing resource support.

Equally, our Turnkey Systems Division provided total U.K. coverage, marketing Honeywell Level 6 mini-computer systems and supporting software to a wide range of U.K. users.

Experienced Salesmen capable of developing their own territories are urgently required. A substantial quantity of leads are also supplied by extensive and vigorous advertising campaigns and Road Show ventures. Salesmen must possess an adequate mini-computer knowledge for Turnkey Systems products. [illegible] and high prospective incentives. Apply by telephone for interview during the next week at our Birmingham Data Centre. All U.K. territories will be controlled from the pending regional development of other Centres.

Consultant: John Wood.

We have many contract vacancies advised each week. Telephone now for a Contractor's profile form urgently and we will offer you an unrivalled selection of opportunities each month. Even if you are not available for a month or two, register today and let us reserve top opportunities for you to be phased on to later. Telephone 0782-623665 (10 lines). Don Philp, Don Walklate, John Wood, Selina Mills.

EMS is where the careers are!

EMS

WHY NOT SEE HOW MUCH £££ THE TOTAL MARKET VALUES YOU?

EMS are inundated every week with hundreds of new vacancies. Equally we provide employers throughout the entire UK with a total weekly list of candidates seeking new opportunities within their area. Each candidate can be cross matched against as many as 3,000 vacancies to find ideal computerised matchings. Many candidates have as many as 50 prospective interviews to choose from with EMS. We find every possible opportunity for you. Hundreds of pounds of personalised efforts and **free.** EMS get results. Let the EMS computers go to work for you! Support your industry! Complete the EMS career form.

TURNKEY SYSTEMS—SYSTEMS DEVELOPMENT MANAGER

NEG + BONUS

EMS has embarked upon a further diversification with the launching of a sophisticated new Data Centre based in Birmingham and handling U.K Turnkey Systems Development. We now require a Senior, experienced Manager capable of guiding and directing Analysts in Feasibility Studies with prospective clients to the sizing of core requirements and dialogue of final tender. Equally, a competent knowledge of systems programming and operating systems is sought. We envisage the successful applicant having previous experience of manpower planning and control. Ability to motivate and lead will be an important factor. Equally, we anticipate candidates having a good technical knowledge of Data Processing, with sound commercial knowledge and judgement. Ability to present a concise, business case to clients at Board level will be important as will the confidence to address a user group of between 50 and 250 delegates at annual conventions.

The successful Manager will play a major role in the development of our Turnkey Systems Division and must be prepared to accept the pressures and responsibilities commensurate with a high growth sector, in order to progress to the ultimate career opportunities within the company. A bonus scheme is in operation for senior management throughout the group and assessed on individual unit performance. This position represents the opportunity of [illegible] Age 30 to 50 preferred. Relocation assistance where appropriate. Apply initially to J. L. Wood, Managing Director, and return the attached form to the Newcastle office.

D.P. MANAGER DESIGNATE

THAMES VALLEY UP TO £7,000

Our client, who has recently ordered an IBM System 3 Model 15 and a remote System 34, is looking for a highly professional Analyst/Programmer with the potential and drive to become the company's Data Processing Manager in approximately 2 years time.

The successful applicant for this challenging and rewarding position will have a proven record of successful project implementation and 2 years experience of programming in RPG II. He or she will initially play the major role in implementing an extremely sophisticated order processing and inventory control system, with equally challenging and interesting new developments planned for the future.

The position reports directly to the European Data Processing Manager and is based in rural surroundings in the heart of the Thames Valley but there will be a future requirement for some European travel.

Our client is offering an exceptionally attractive benefits package in addition to a starting salary of up to £7,000 per annum to the successful applicant who has his or her long-term career in mind.

If you are interested in this first-class opportunity please complete and return the attached application form quoting DP TV or ring DON PHILP on 021-454 7906

COBOL PROGRAMMER

BIRMINGHAM TO £5,200

An engineering group with a Honeywell Level 62 services computer urgently need an experienced Cobol Programmer. Any machine acceptable to help with ongoing development and maintenance of existing systems. Candidates must be capable of working for long periods without supervision and be accustomed to providing a high standard of support documentation. Occasional involvement in systems development will also be available if required. Current applications include sales order processing, analysis, purchasing ledgers and payroll. A small team handles all development and maintenance with external turnkey assistance for any major development work.
CONSULTANT DON PHILP TEL 021 454 7906

PROGRAMMERS

HERTS TO £8,400

Britain's first IBM Series 30 site has a large number of outstanding vacancies on numerous interesting new development projects. Experienced IBM PROGRAMMERS are urgently sought to work on large project teams. Any IMS TFO experience would be especially valuable. Otherwise, general OS/COBOL will be acceptable [illegible]
CONSULTANT DON PHILP TEL 021-454 7906

ANALYST PROGRAMMERS AND PROGRAMMERS

ESSEX TO £5,000

Experienced programmers are urgently required for a group bureau to work on a wide variety of client systems and packages. Candidates should possess [illegible] Cobol or PL/1 in a commercial or industrial environment. Interviews will be arranged within a week of application for appropriate candidates.
CONSULTANT JOHN WOOD

ANALYSTS

HERTS TO £7,200

One of Britain's largest [illegible] has a large quantity of outstanding systems vacancies to cope with substantial expansion plans being developed. The client requires an IBM background preferably with some programming experience. Any IMS or COBOL [illegible] working conditions are excellent with [illegible] and [illegible] projects and good career development opportunities. [illegible] applications and a wide range of [illegible] new products. Relocation assistance will be provided where appropriate.
CONSULTANT DON PHILP TEL 021-454 7906

OPERATORS

NORWICH TO £3,200

Applicants are required for the operation of 2 IBM 360s working on a three shift system in a bureau environment. The operator is responsible for running either one of the above machines. Equally there is close liaison with Data Control staff. The successful candidate must be businesslike in appearance and be capable of effectively representing the company in occasional client discussion.
CONSULTANT SUSAN ADAMS

ANALYSTS

BRIGHTON TO £5,000

Analysts are sought within the Management Services Department of a large industrial group which is responsible for all computerised and non-computerised systems and procedures. Application areas include [illegible] IBM hardware, but will accept alternative machine experience. A minimum 'A' level educational standard is preferred. Relocation assistance provided.
CONSULTANT CAROL PROUDMAN

TURNKEY SALESMEN

U.K. TO £8,000

A large mini producer requires numerous additional salesmen to assist with expansion plans throughout the U.K. and to promote a wide range of equipment to industrial and commercial users. Office locations include Birmingham, Manchester, Brighton and Leicester. All [illegible] small business systems.
CONSULTANT DON PHILP TEL 021-454 7906

ANALYSTS & PROGRAMMERS

NOTTS NEG

A major [illegible] group [illegible] additional staff to work on a major stock replacement system. This will be for a production material inventory which involves telecommunication links for data transmission between the factories. [illegible] production planning and costing systems currently being extended. Dual IBM 370 are operated. Fringe benefits include pension schemes and profit sharing.
CONSULTANT DON PHILP TEL 021-454 7906

SYSTEMS ANALYST

SURREY TO £7,000

Responsibilities will include making a technical input to many projects where a high software content is involved and in particular to enable the company to engage in projects where micro processors are a large part of the [illegible] content. The candidate elected will be highly versatile [illegible] required. We envisage candidates having a good knowledge of simulation software, a capability to train others in micro processor techniques and have the ability to sell micro processor systems to new potential users.
CONSULTANT. DON PHILP TEL 021-454 7906

SYSTEMS ENGINEERS

SOUTHERN REGION TO £7,500

A large number of opportunities currently exist with Southern manufacturers for experienced technical programming and systems staff to work in the Aeronautics Defence Systems and Process Control sectors. Basic requirements are for a sound knowledge of analogue and/or digital computing, real-time programming using ASSEMBLER, FORTRAN or CORAL and a possible knowledge of simulation techniques. Particularly advantageous would be any knowledge of aircraft flight equations and derivatives, or engine design and development or mathematical modelling. Complete the EMS career form today and let us provide a whole new world of current opportunities for you within an area of your choice.
CONSULTANT DON PHILP TEL 021-454 7906

SYSTEMS ANALYST

MIDDLESEX TO £6,600

The successful applicant will have at least 3 years applications programming experience, preferably using COBOL. Equally he/she will have designed or controlled the development of major computer systems through to implementation. On-line systems experience, especially again with previous programming knowledge is sought, preferably using CICS. All applicants must have good IBM 370 experience.
CONSULTANT JOHN WOOD

COMPUTER DEVELOPMENT MANAGER

S.W. LONDON TO £7,750

Preference will be for graduates or degree level candidates capable of controlling 10 operators and 6 analysts and programmers. The successful candidate will report to the Data Processing Manager and be responsible for the daily running of the department. The post also involves responsibility for the specification and design of computer systems, ability to control and allocate tasks to analysts and programmers, ability to define and maintain work schedules within operations and to set and maintain standards. Previous experience of NCR would be advantageous although other hardware will be acceptable.
CONSULTANT DON PHILP TEL 021-454 7906

CUSTOMER SERVICES PROGRAMMERS

BERKSHIRE TO £6,000

Our client is a major bureau providing a diverse range of services to Southern accounts. Preference will be for candidates with ICL 1900 or 2900 series experience using GEORGE III or VMEB, COBOL, FORTRAN or PLAN language. Successful candidates will be responsible for customer training and will produce and run client demonstrations. Equally, he/she will visit prospective clients with salesmen and also make courtesy visits to established clients. We envisage you writing customised software and production of technical literature.
CONSULTANT DON PHILP TEL 021-454 7906

200 SYSTEMS DESIGNERS AND PROGRAMMERS

MANCHESTER AREA TO £7,500

Systems Designers and Senior Designers have responsibility for the design and production of complete suites of software and for the integration of software and hardware in major custom-designed projects. They are also expected to provide technical support to sales staff and users. Programmers and Senior Programmers are sought with at least 2 years' experience of real time programming. Any current or previous design experience would be especially advantageous. Our client specialises in the production and application of computers to industrial process control and real time data communications. A wide variety of opportunities are available within a rapidly expanding group.
CONSULTANT JOHN WOOD

OPERATORS

KENT £2,800 PLUS 25% SHIFT

Our clients urgently require operators with ICL 1900 GENROE II and Manual Executive experience. A minimum 1 year's operating experience is essential. The installation is a 1902T with 11 disk drives and 80K core, operating an on-line system. Three shifts are currently being worked with an extended night shift for which overtime rates are paid. [illegible] Stations.
CONSULTANT CAROL PROUDMAN

ANALYSTS

LONDON E1 TO £8,000

Candidates should possess IBM experience, preferably with knowledge of OS/VS1 and have a minimum of 3 years' commercial systems experience. Analysts must have an adequate knowledge of File Design techniques and information gathering. Equally, you should be able to assist with feasibility studies and preparation of systems proposals. Duties will also comprise writing programming specs, through to systems testing and implementation. Relocation assistance provided.
CONSULTANT DON PHILP TEL 021-454 7906

ANALYST/PROGRAMMERS & PROGRAMMERS

MIDLANDS & LINCS TO £8,500

Our clients require a large quantity of experienced IBM COBOL [illegible] throughout the Midlands and Lincs. Equally, systems programmers with experience of the following PL1 or APL are sought. Specialist experience in any of the following areas would be of particular interest: SYSGENS, IMS, TSO, TP access methods, BTAM/VTAM/TCAM etc., or VSPC. This major industrial group requires both commercially orientated and systems programming candidates to assist with major expansion plans during the coming months.
CONSULTANT DON PHILP TEL 021 454 7906

ANALYSTS PROGRAMMERS & PROGRAMMERS

LONDON SE1 TO £7,000

The successful applicant will undertake overall responsibility for 2/3 large systems, user communications, analysis of requirements and [illegible] programme and amendments specifications and occasional programming. DP staff are also responsible for the preparation of user and operations documentation. The client will require you to Time Estimate and Cost projects in addition to undertaking occasional programmer project control.
CONSULTANT CAROL PROUDMAN

PROGRAMMERS TO SYSTEMS ANALYSTS

LEEDS UP TO £7,000

A substantial quantity of new positions are now available with an expanding Leeds installation. The clients seek staff with a minimum 2 years' [illegible] applicant on his/her potential contribution towards the installation. Career progression opportunities are good. Please complete the attached application form and return it ASAP. Job specs will be forwarded by return.
CONSULTANT DON PHILP TEL 021-454 7906

SYSTEMS & PROGRAMMING CONSULTANTS

£6,000–£8,000

For these lucrative positions with the consulting support division of a major manufacturer working in the Local Government and Defence Systems Sector, we seek experienced candidates with at least 7 years DP involvement and 80% of that minimum in programming. Hardware knowledge of ICL 1900s, 2900s, 1800s – 2903s will be essential. Within the Software Sector we envisage you having sound knowledge of Database systems such as IDMS, SCL, some previous knowledge of Real Time could be advantageous and especially so would be any experience with DRIVER [illegible] etc. Candidates must be mobile to assist with client support throughout varying U.K. regions. Attractive career development [illegible] successful candidates.
CONSULTANT DON PHILP TEL 021-454 7906

ANALYST/PROGRAMMERS

ESSEX TO £6,000

Our client requires practical knowledge of programming with at least 2 years' COBOL experience. Equally, they seek practical experience in the design and implementation of at least 2 major projects, preferably associated with Accounting or Production/Stock Control. Experience of ICL or Data General equipment would be advantageous. Applicants must be self motivated and capable of working in a bureau environment.
CONSULTANT. CAROL PROUDMAN

PROGRAMMER/ANALYST

SURREY TO £4,500

Education to HNC/Degree level is sought. Duties will include one or more of the following

(1) Programming in a high level Test Applications language (ATLAS) analysis/validation of Atlas programmes
(2) Programming in ASS 300 Symbolic Assembler (ATE Controller/Computer type 800)
(3) [illegible] ASSEMBLER, use of PDP-11 for CORAL 66 programming [illegible] automatic test techniques. Candidates ideally will currently be employed either by mainframe manufacturers or Avionic/Electronic suppliers.

CONSULTANT. DON PHILP. TEL: 021-454 7906

EMS CONSULTANTS LTD
61 LOWER STREET
NEWCASTLE UNDER LYME
STAFFORDSHIRE, ST5 2RS
Telex 36636

Management Services & Computing Division
Telephone: 0782 623665/6/7/8
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[illegible]

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Company Ref. No.

SURNAME
Other Names
Address — Telephone: Home / Bus / Ext.
Post Code

Age	Date of Birth	Place of Birth	Nationality	Height	Weight

Married	Children	Car Owner	Driver	Nature of any Serious Illness

Position Required — Required Salary Range
Present Position — Salary

WHERE DO YOU WISH TO WORK

Within U.K.	Yes/No	Acceptable Areas	Abroad	Yes/No
Will you move	Yes/No		Europe	Yes/No
			Middle East	Yes/No

NUMBER OF YEARS EXPERIENCE

Operating	Programming	Systems Design	Systems Analysis	Management	Total

Available for Interviews
Available for Employment

DETAILS OF SECONDARY AND FURTHER EDUCATION

Schools	Date	Examinations Passed
College/University	Date	Examinations Passed

Business Courses with Dates

1. Present Employer — Town
Position — Date Joined

TYPE OF INSTALLATION: Commercial / Manufacturing / Bureau / Banking / Insurance / Education / Scientific / Engineering

HARDWARE	OPERATING SYSTEM	LANGUAGES

Software or Packages

On-Line / R.J.E. / Real Time / Tele Processing / Time Sharing / Data Base

APPLICATION AREAS YOU HAVE BEEN INVOLVED IN (Please Tick)

Cost Accounting	General Ledger	Manpower Planning	Personnel
Budgeting	Credit Control	Stock Control	Payroll
Forecasting	Order Processing	Production Control	O.R.
Corporate Planning	Marketing	Petrochemicals	Radar
Sales Ledger	Distribution	Linear Programming	Statistics
Purchase Ledger	Traffic Analysis	Simulation	

Projects Completed — Responsibilities

2. Previous Employer — Town
Position — Date Joined

TYPE OF INSTALLATION: Commercial / Manufacturing / Bureau / Banking / Insurance / Education / Scientific / Engineering

HARDWARE	OPERATING SYSTEM	LANGUAGES

Software or Packages

On-Line / R.J.E. / Real Time / Tele Processing / Time Sharing / Data Base

APPLICATION AREAS YOU HAVE BEEN INVOLVED IN

Cost Accounting	General Ledger	Manpower Planning	Personnel
Budgeting	Credit Control	Stock Control	Payroll
Forecasting	Order Processing	Production Control	O.R.
Corporate Planning	Marketing	Petrochemicals	Radar
Sales Ledger	Distribution	Linear Programming	Statistics
Purchase Ledger	Traffic Analysis	Simulation	

Projects Completed — Responsibilities

Reason for Seeking Change

Details of type of position wanted

Additional Information –
Please explain below, in 8-10 line precis, your current duties and applications experience

FOREIGN LANGUAGES

Spoken	Written	Read

Please show the number of years experience of the following. Where your experience is not specified please use the blank spaces.

HARDWARE	OPERATING SYSTEM	LANGUAGES	PACKAGES/SOFTWARE
IBM 360/370	DOS	COBOL	FILETAB
ICL 1900	OS	FORTRAN	DRIVER
ICL 2960/2970	MVT/MFT	ASSEMBLER	CICS
ICL 2903	GEORGE 1	PLAN	IMS
UNIVAC 1100	GEORGE 2	PL1	BOMP
UNIVAC other	GEORGE 3	RPG 2	D BOMP
BURROUGH 700/800	MCP	USERCODE	PERT
BURROUGHS other	Exec 8	AUTOCODE	V SAM
HONEYWELL 66	GCOS	EASYCODER	IDS/TDS
HONEYWELL 6000	OS 2000/200	ALGOL	MICROFILMING
HONEYWELL other	VMEB/VMEK	NEAT	TELEPROCESSING
NCR	J Level	CORAL	OMS
ICL System 4		OL1	
PDP			

3. Past Employer — Town
Position — Date Joined

TYPE OF INSTALLATION: Commercial / Manufacturing / Bureau / Banking / Insurance / Education / Scientific / Engineering

HARDWARE	OPERATING SYSTEM	LANGUAGES

Software or Packages

On-Line / R.J.E. / Real Time / Tele Processing / Time Sharing / Data Base

APPLICATION AREAS YOU HAVE BEEN INVOLVED IN

Cost Accounting	General Ledger	Manpower Planning	Personnel
Budgeting	Credit Control	Stock Control	Payroll
Forecasting	Order Processing	Production Control	O.R.
Corporate Planning	Marketing	Petrochemicals	Radar
Sales Ledger	Distribution	Linear Programming	Statistics
Purchase Ledger	Traffic Analysis	Simulation	

Projects Completed — Responsibilities

PLEASE CHECK THAT EACH SECTION HAS BEEN TICKED APPROPRIATELY

ADDITIONAL INFORMATION

General

Data Processing

Terminals

Software/Packages

Application Areas

Projects and Responsibilities

ST THOMAS' HEALTH DISTRICT (TEACHING)
Sharpey-Schafer Centre

On-Line Hospital Computing

The Centre has a HONEYWELL SIGMA 6 with 512kB of core and 432MB of disc, and a PRIME 300 with 256kB of MOS memory and 60 MB of disc. Terminals include VDU's, teletypes, laboratory analysers and an optical mark reader. Information will be exchanged between the two machines via an asynchronous line when the appropriate software has been implemented.

The immediate need is for the development of a large on-line system to manage several hundred routine Haematology tests and reports per day. This will be integrated with other applications via a centralised file base.

Languages are FORTRAN, COBOL and CORAL. Structured programming techniques are employed using on-line facilities. There are currently vacancies for programmers to work on developing the Haematology application or on writing support software. Training can be provided where needed.

Programmers

Scale 1: £3,452-£4,421 plus £354 L.W.
or
Scale 4: £4,421-£5,326 plus £354 L.W.
(depending on experience)

Applicants should have at least 12 months' relevant commercial or industrial experience, or an honours degree (or equivalent) in Computing Studies.
The Hospital has good canteen and social facilities and is close to Waterloo Station.

Application forms may be obtained from Personnel Department, St. Thomas' Hospital, London SE1 and should be returned by 28th September, 1978.

THE OPEN UNIVERSITY

STATISTICS PROGRAMMER

(£3,983 - £6,555 under review)

A vacancy has arisen within the Statistics Team in the University's O.P. Division. THIS team is responsible for the development of orthodox systems providing statistical analyses of administrative data as well as providing the computing expertise required in special statistical and survey work undertaken by the Institute of Educational Technology. The team's effort is divided fairly evenly between these facets of our work. Most of the programs in the administrative statistics systems are written in COBOL but some use is made of FILETAB. The more sophisticated statistical work requires FORTRAN programming and the use of statistical/survey analysis software such as the SPSS and OSIRIS packages.
The person we are seeking will ideally have two or more years' COBOL and/or FORTRAN experience but a less experienced applicant with suitable potential would be acceptable. He or she will be required to apply their existing computing skills to the ongoing work of the team while extending their range of expertise. This is an excellent opportunity for a suitable person to broaden their experience through using a variety of programming languages and statistical software as well as through a limited amount of user contact. Exposure to statistical methodology is not essential but would be considered an advantage.
We offer seven weeks' holiday, and excellent social and sporting facilities. Application forms are available, by postcard request please, from The Recruitment Office (3OST/1), The Open University, P.O. Box 75, Walton Hall, Milton Keynes, MK7 6AL or telephone Milton Keynes 63404. there is a 24-hour answering service on 83680.
Closing date for applications 29th September, 1978.

Senior Analyst

(£4,461 - £4,761 p.a. plus supplement of £312 p.a.)

Applications are invited for the post of Senior Analyst in the Department of Computing Services. The successful candidate will be responsible for the systems required by the Administration (e.g. Student Records).
The Polytechnic has recently installed a DEC-20 to replace a 1905 and the Administration programs are currently being converted.
This post will require a good working knowledge of COBOL gained over a period of about 3 years. Experience of DEC 10 or 20 systems would be an advantage, as would a knowledge of I.C.L. 1900, COBOL or RPG2. A manufacturer training course will be arranged if necessary and facilities for further part-time study for higher qualification may be available to a suitable candidate.
Further details and form of application from the Assistant Director and Chief Administrative Officer, Trent Polytechnic, Burton Street, Nottingham. Closing date 9th October, 1978.

TRENT POLYTECHNIC NOTTINGHAM

CARDIFF UP TO £5000

PROGRAMMER/ANALYSTS

We require at least 12 months' programming experience

Tel. 0222 33131 extn. 3326

BUILDING SOCIETIES

A RECRUITMENT FEATURE

On September 28th Computer Weekly will be highlighting career opportunities with Building Societies.
To advertise in this high reader interest feature contact
Josie Poole or John Farrer on 261 8484 or 261 8098

PLYMOUTH POLYTECHNIC
Computer Centre

SENIOR PROGRAMMER

Salary: £4461-£4791 (+£312 p.a. supplement)

The installation consists of a 64K 1903A running a version of George II and Maximop and a 28K ICL 2903 Educational System.

Duties of the Senior Programmer will include development and enhancement of programs and packages for administrative teaching and research purposes, installation and maintenance of applications packages and program advisory service for the Polytechnic and other educational establishments, including Schools in the South West.

A good working knowledge of Fortran is essential. Experience of Basic, Cobol, Statistics and 1900/2803 Series machines would be an advantage.

Application forms to be returned by 29th September 1978 can be obtained with further particulars from the Personnel Officer, Plymouth Polytechnic, Drake Circus, Plymouth PL4 8AA.

FOR CLASSIFIED ADVERTISEMENTS IN COMPUTER WEEKLY

Ring Eddie Farrell or Mark Williams on 01-261 8028 01-261 8019

CONTRACT PROGRAMMERS and ANALYSTS

2 Assembler Singer 10	all areas
2 ICL 1500	all areas
1 Cobol ICL 2903	S. London
3 Cobol Univac 1110	Essex
2 Cobol IBM 370-158	Herts
2 Cobol PL1-DL1 Cics	W. London
1 PDP Macro - 11	S. London
1 Cobol 370-135 DOS-VS	S. London

We have also an urgent need for Senior Analysts in London

Telephone me now on 01-531 9131
Tricia Watts
Manhattan, 6-8 Lanks Hall Road, London E.4

THE CITY UNIVERSITY

Computer Programmer

Required to join a small team involved with administrative systems within the University which has the use of a dual ICL 1905 E configuration, operating under GEORGE and MAXIMOP, and a separate Philips visible records machine.

Applicants should be familiar with ICL 1900 equipment, software and operating systems and have sound commercial experience using COBOL and at least one low level language.

Salary will be on the scale £3834 to £6054 p.a. inclusive; 35 hour week, 34 days annual leave including public holidays. The University also provides cafeteria and recreation facilities.

Please write to the Personnel Office at the City University, St John Street, London EC1V 4PB or telephone Mrs. M. McMaster, Personnel Assistant, on 01-253 4399 extension 334 for an application form and further details.

FOR CLASSIFIED ADVERTISEMENTS IN COMPUTER WEEKLY

Ring Eddie Farrell or Mark Williams on 01-261 8020 01-261 8019

CRC INFORMATION SYSTEMS at SLOUGH
Require an

ELECTRONICS ENGINEER

(location Slough) to assist the Communications Manager in the design and maintenance of Electronic equipment. A familiarity with mini/micro computers and/or data communications equipment is desirable but not essential. Salary c. £5,000 p.a.
Apply in confidence to:
Chris Dennis
Communications Manager
CRC Information Systems Ltd.
780 DEAL WAY
SLOUGH SL1 4SH

Systems Designers

Saudi Arabia £8,800-£10,900 after tax

Do you have at least 2 years' experience using mark IV on a 370 operating under OS/VS? Have you at least 1 year's experience of COBOL, PL/1 and time sharing option?
Have you worked on major materials/inventory control applications?

ARA Astral Recruitment Associates

RESEARCH ASSISTANT OR ASSOCIATE

in charge of

COMPUTING FACILITIES

at a Medical Research Council Unit, Cambridge

The appointment is on a Research Assistant (£2,850-£5,058) or Research Associate £4,386-£5,730 scale, depending on age and experience.

The appointee will be required to manage and develop a computer system (PDP 8, 11 and 12) used for storing and analysing behavioural data, and to design and build special research equipment.

Applicants with relevant electrical engineering or electronics qualifications and some experience in one or more of these fields will be preferred (i) interfacing mini computers (preferably PDP's), (ii) using operating systems (preferably RT-11); (iii) computer maintenance. Some programming ability (especially in assembler code) also an asset.

Applicants should write to The Director, M R C. Unit on the Development and Integration of Behaviour, University Sub-Department of Animal Behaviour, Madingley, Cambridge CB3 8AA

NORTH WEST THAMES REGIONAL HEALTH AUTHORITY
REGIONAL COMPUTER SERVICE

SYSTEMS DEVELOPMENT OFFICER (Scale 23)

SALARY SCALE £7,309-£8,777 PER ANNUM (INCLUDING LONDON WEIGHTING)

The successful applicant will be accountable to the Regional Computing Services Officer for the investigation of all proposed user installations, the conduct of feasibility studies, the quality and quantity of work and the supervision of systems designers and programmers allocated to project teams. Professional leadership is essential; together with sound managerial experience and an ability to liaise with medical, scientific, financial and administrative staff in specialised computing areas to plan the installation of systems meeting users' operational needs. A large ICL 1904S computer is installed in a new building near Friern Barnet Town Hall. A number of other computers are used.

Application forms and further particulars from the Regional Personnel Officer, North West Thames Regional Health Authority, 40 Eastbourne Terrace, London, W2 3QR (Telephone No. 01-262 8011, Ext. No. 281), returnable by September 28, 1978, quoting reference number 350/CW/14/9. Applicants from outside the service commence at the minimum of the scale.

SOUTH COAST

GET ON-LINE . . . BROADEN YOUR HORIZONS . . .

FINANCIAL SYSTEMS ANALYST c. £6000 and PROGRAMMERS c. £4000

Can we interest you in a CRUISE?
Shipping company requires a Financial Systems Analyst with 3/4 years' proven experience to re-assess and maintain many of the company's existing financial systems.
Extra benefits include travel expenses, pending relocation.
This Company also needs PROGRAMMERS with one to two years' COBOL experience. Applications include general commercial systems and payroll, stock control and accounting ledgers.
COBOL experience on any large mainframe considered.

ANALYST/PROGRAMMER £5000

ICL 1900 COBOL/PLAN
International Company involved in Freight/Containers. Our client is looking for an all-rounder to become part of a team currently implementing an ON-LINE shipping system.
Department is DYNAMIC and DEVELOPING at a rate of KNOTS!
Among other applications to be designed is an inland transport movement.
3/4 years' analysis experience with knowledge of COMMUNICATIONS and COBOL/PLAN programming an advantage.

ANALYST/PROGRAMMER c. £4500

2903/4
Chemical Company on the South Coast currently operates a 1901A and has vacancies for experienced staff to strengthen their programming teams, so that an efficient ON-LINE ORDER ENTRY system can become live as soon as the current machine is replaced by a 2903/4. JCL experience a distinct advantage.

These positions offer the usual employment benefits including substantial relocation packages. Travel assistance. Company pension schemes, etc.

DON'T TREAD WATER . . . DON'T JUMP IN AT THE DEEP END. SWIMMING IN A SEA OF UNSUITABLE JOBS . . . CONTACT COLIN SHINGLETON —

Meteor Computer Consultants Ltd.,
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Telephone 01-946 4424

UNIVERSITY OF ST. ANDREWS
Department of Computational Science

Applications are invited for a post of

RESEARCH ASSISTANT

to work for one year on a project associated with the development of software tools for microprogrammable computers. The successful candidate must be proficient in both high and low level computer programming. The project is supported by the SRC and will continue for one further year. Salary at appropriate point according to qualifications and experience on 1B Research scale £3,189-£4,801 (under review).
Applications (two copies) including a curriculum vitae and the names of two referees should be sent by 6th October, 1978 to the Establishments Officer, the University, College Gate, St. Andrews, Fife, from whom further particulars may be obtained.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE
(University of London)
Keppel Street, WC1E 7HT

A PROGRAMMER/COMPUTING ASSISTANT

is needed for the MRC funded Epidemiological Monitoring Unit in the Department of Medical Statistics and Epidemiology. Candidates should be graduates or have suitable experience. The gross salary will be in the range £3490 to £4771, depending on experience.

Applications, consisting of full curriculum vitae and naming two referees, should be sent to Secretary (A1) at the above address. For further information telephone 01-636 8636 Ext. 245.

PL/1 and Assembler PROGRAMMERS

£4,500-£7,000

SYSTEMS PROGRAMMER £5,058-£6,345

A good Assembler Programmer familiar with JCL is required to work in the group responsible for OS and IMS software support. If you have already been involved in systems programming so much the better. A PL/1 programmer with systems programming aptitude may also be considered.

SUPPORT PROGRAMMERS £4,530-£6,345

Competent PL/1 programmers are needed to work in the Section responsible for the maintenance and development of the batch and teleprocessing applications. Experience of working in a OS/OC environment would be an added advantage.

DATABASE SUPPORT PROGRAMMERS £4,530-£5,853

These vacancies are in the Section responsible for database and PL/1 support. Applicants should have at least 2 years' programming experience preferably in PL/1, and a good working knowledge of JCL. Experience in a database environment is essential. Further related experience such as IMS, DAL, OS would be an advantage.

PROGRAMMING TEAM LEADER £6,345-£6,987

A senior PL/1 programmer capable of managing up to 10 staff is required to work on the development of interesting projects utilising DL/1 databases in both batch and teleprocessing environments.

APPLICATIONS PROGRAMMERS £4,530-£5,853—£6,012-£6,345

To work within project teams on PL/1 programs for batch and teleprocessing applications including the use of DL/1 databases.

LOLA provides computer facilities to four large London Boroughs. On-line access and updating of complex databases is provided on over 130 remote VDUs with PL/1 programs running under IMS/VS. Current equipment is a 3-megabyte 370/158 running under VS1, with a major hardware expansion and conversion to MVS planned for next summer.
For all the above vacancies, starting salaries will be set, within the range quoted, according to experience. Training will be given where necessary both to fill in gaps in your initial experience and to keep pace with current and future developments.
For an application form and further details of LOLA and the posts available, write or 'phone (indicating which post(s) interest you), to
Mrs. B. L. Dorrington, LOLA, Tower Point North, Sydney Road, Enfield, Middx. EN2 6UE Tel. 01-366 6611 (Ext. 276).

LOLA

PERMANENT AND CONTRACT PROGRAMMING STAFF YORKSHIRE AND LANCASHIRE

We have clients who require contract or permanent staff to join their development teams. The work requires a good knowledge of COBOL, or a low level language (ASSEMBLER, PLAN, USERCODE, etc.). Contract personnel can expect assignments of 6 months at attractive rates. Permanent employees enjoy good salaries and excellent conditions of employment.

Please contact either Ken Grimsley or Jeff Worsley on SHEFFIELD (0742) 25069.

Fraser Williams computer consultants

LIVERPOOL POLYTECHNIC
DEPARTMENT OF MATHEMATICS

SENIOR PROGRAMMER
Grade T.4 (2 posts)

PROGRAMMER
Grade Tib/2 (1 post)

Qualified, experienced programmers to work with a team providing support to the Polytechnic including research and administrative users of the Computer 1903A-64K disc tape system is installed, the majority user work is COBOL FORTRAN and PLAN, together with packages of various types.
Salary scales
T 4 £3,933-£4,320+ £312 p.a.
Tib/2 £3,244-£3,339+ £312 p.a.

Application forms and further particulars from the Personnel Office, Liverpool Polytechnic, Richmond House, 1 Rumford Place, Liverpool L3 9RH. Tel: 051-227-4881, Ext. 43.
Please quote reference LP/221.
Closing date is fourteen days from the appearance of this advertisement.

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urgently required for Trainee positions. Industrial scientific and Commercial situations
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NEXT WEEK NORTHERN RECRUITMENT FEATURE

Advertisers are reminded that the next Computer Weekly area feature will be published on September 21 and will highlight career opportunities in the North.

Space reservations should be made as soon as possible to:
Owen Kelly — Manchester — 061-872 4211
Eddie Ferrell — London — 01-261 8097
Copy Deadline: PM Friday before

COMPUTER WEEKLY
THE INDUSTRY'S WIDEST READ AND MOST REQUESTED NEWSPAPER

SOUTH WALES IBM 360/370 OPERATOR

STARTING SALARY c. £4,200 P.A. PLUS PAID OVERTIME

★ FREE BUPA ★ BONUS SCHEME
★ RELOCATION EXPENSES ★
★ DISCOUNTS ON COMPANY PRODUCTS ★

Our client, a dynamic International Organisation, has a vacancy for an Operator to join their Manufacturing and Distribution Centre in South Wales.
The computing activities are currently centred around an IBM 370/138 with half a megabyte of core using CICS to control a tele-processing network for on-line interrogation throughout the company.
Candidates should have:
★ a minimum of 12 months' operating experience within a 360/370 DOS/VS installation
★ A working knowledge of DOS JCL
★ an appreciation of a tele-processing environment
The successful applicant will be expected to perform all aspects of operational duties within the department and should be capable of deputising for the Shift Leader in his absence.
Interested candidates should contact, without delay
ANDY CARTER on: 021-236 3781 (24 hour answering service) Ref. No. CW/9/1

SPECIALIST COMPUTER RECRUITMENT LIMITED

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BIRMINGHAM 021-236 3781
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MANCHESTER 061-833 9427
Freepost, Blackfriars House, The Parsonage, Manchester M3 2JB
LONDON 01-935 0471
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Computing Services Association

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Systems Designers Limited is a leading well-established and expanding Software Systems Consultancy specialising in mini-computer and microprocessor real-time applications, and operating at the forefront of technology. Growth areas of the Systems Division include:

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Systems Designers Limited controls the career progression of its staff to give them a wide variety of experience, both of project applications and of computer systems. The company is situated on the Surrey/Hampshire border, with good road and rail links to London and yet surrounded by attractive countryside.

Systems Designers Limited require:

Graduates — Up to £3,600

Your education has given you a good academic training. Systems Designers Limited will use this to provide you with a wide practical computing experience. If you have a degree or expect to qualify shortly in a numerate discipline then contact us to discuss your opportunities.

Programmers — Up to £4,500

Programmers are required with up to 2 years experience. As a leading company in minicomputer and microprocessor systems, Systems Designers Limited can provide you with a wide variety of experience in the technical computing fields.

Software Engineers — Up to £6,500

Systems Designers Limited require software systems engineers with up to 5 years' experience in Communications, Industrial or Military systems. We can provide you with a rewarding career at the forefront of technology.

If you can match the challenge of a varied and demanding career, then telephone or write to us to arrange a chat or request an application form.

Contact: Bill Hockey
Operations Director
Systems Designers Limited
Systems House
57-61 High Street
Frimley, Surrey GU16 5HJ
Telephone: Camberley (0276) 63471

Major new commercial scientific and engineering applications

Systems Analysts
Up to £6000 p.a. (Ref. F375)

Programmers
Up to £5550 p.a. (Ref. F356)

The authority operates an ICL 2976 computer and a network of ICL 2903s in divisional centres to meet its increasing computing requirements. Many systems have been implemented but there are still major areas for development in the commercial, scientific and engineering application areas. Communications techniques will be used as appropriate in this new phase of development.

There is currently a need to strengthen certain project teams at the systems analyst and experienced programmer level and applications are invited for these posts from suitably experienced and qualified personnel (male or female). All posts are based at Sheldon on eastern outskirts of Birmingham.

Further details and application forms are available from the Regional Personnel Manager, Severn-Trent Water Authority, Abelson House, 2297 Coventry Road, Sheldon, Birmingham B26 3PU. Telephone: 021-743 4222, ext. 78 or 77.

SEVERN TRENT WATER

GUILDFORD BOROUGH COUNCIL

RPG 2 Programmer
(£3,852 - £4,266 p.a.)

Applications are invited for the above post in the Council's Computer Section, which operates an ICL 2903 computer with 26K store, EDS 60's and DDE. Delivery of a 7502 is expected shortly.

Experience of RPG 2, preferably on an ICL computer, is essential, and experience of ICL software would be an advantage.

For further details and an application form please contact the Personnel Officer, Guildford Borough Council, Millmead House, Millmead, Guildford, Surrey. Telephone Guildford 71111, Ext. 98.

Closing date 26 September, 1978.

Northern Regional Health Authority

Senior Computer Programmer

The Northern Regional Health Authority require a Senior Computer Programmer with a minimum of 5 years' COBOL experience, some of which should have been in a supervisory capacity. A knowledge of PLAN would also be an advantage.

The computer services for the region are centralised at the Authority's Headquarters at Walkergate, Newcastle-upon-Tyne.

The work carried out includes hospital, nursing, financial, administrative, works and community health systems together with experimental projects involving the use of terminals.

The modern computing centre contains a 96K 1904S running under George 3. Techniques used include on-line program development via VDUs.

A 37-hour flexible working week is in operation.

Salary scale (Scale 9) £4959-£6025.

New entrants to the service will normally start at the minimum of the scale. Application forms and job descriptions available from Regional Personnel Officer, Northern Regional Health Authority, Benfield Road, Walkergate, Newcastle-upon-Tyne, NE6 4PY. Closing date 25 September, 1978.

TIMES NEWSPAPERS LIMITED

SENIOR PROGRAMMER £7,000

Times Newspapers Limited are currently implementing one of the most advanced computer based newspaper production systems in the U.K., utilising data base and real time techniques on a network of mini-computers.

A Senior Programmer is required who will be responsible to the group Data Processing Executive for all aspects of software development.

Applicants must have at least five years' mini-computer programming experience, preferably using Hewlett-Packard equipment, and be capable of communicating with all levels of staff and of planning and controlling software development projects. Additionally this position requires several of the following attributes

- —A working knowledge of FORTRAN IV and Assembler languages.
- —Experience of real time and database processing techniques.
- —The ability to write interface software for non-standard peripherals.
- —Experience gained in either the newspaper or publishing fields.

Salary negotiable depending on qualifications and experience.

Please write with full personal and career details to:
Desmond Heyes, Employment Manager
TIMES NEWSPAPERS LIMITED
200 Gray's Inn Road, London, WC1

CHIEF PROGRAMMER
Leicester c£6500

Our client a leading British group wishes to strengthen its programming department. This vacancy in an ICL 2900 installation arises through internal promotion and further expansion of services to the group.

A mature professional programmer is required to take charge of all aspects of applications programming. Candidates should have at least five years commercial programming experience using COBOL and previous experience of ICL equipment would be advantageous.

The successful candidate will probably be a team leader in a large installation or already a Chief Programmer in a smaller department.

A generous salary package will be negotiated around £6500 and removal expenses paid in appropriate circumstances.

Please telephone or write to Ivor Norton, in complete confidence, quoting reference c/78082 at the address below.

Ivor Norton Management Services Ltd
Recruitment Consulting Division
P.O. Box 63, Copthall Tower House, Harrogate HG1 1TS Tel. Harrogate 66628

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co op COMPUTER SERVICES.. CWS Computer Group

Senior Systems Analysts
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Manchester Based

CWS Computer Services satisfies the total data processing needs of the £1,400 million turnover Co-operative Wholesale Society Limited and in addition provides computer services to Co-operative Retail Societies and other commercial organisations through its six regional Computer Service Centres.

A planned expansion of the Computer Group Software Department has led to vacancies for Analysts and Programmers to work on a variety of development projects for Manufacturing, Warehousing and Distribution and Accounting systems. Many of these development projects include the use of terminals linked to one of the Group's main-frame computers.

Competitive salaries will be offered to the right applicants with relocation expenses where appropriate. If you would like to discuss these opportunities telephone. — Peter Griffiths, Systems Manager ext. 6626, Tom Wilson, Programming Manager ext. 6848 or write giving full career details to Bobbie Buchanan, Computer Group Personnel Officer, CWS Limited, P.O. Box 53, New Century House, Manchester M60 4ES. Tel. 061-834 1212.

co op COMPUTER SERVICES.. CWS Computer Group

CWS MAINFRAMES

Manchester 2 x ICL 1904S (shortly to be enhanced to 3 x ICL 2960).
Glasgow ICL 2904
Ipswich ICL 2904
Nuneaton ICL 2904
Birtley ICL 1902T
Godalming ICL 1904A
Liverpool ICL 8959

University of Glasgow
COMPUTING SERVICE

Cobol Programmers

Applications are invited from individuals with experience of programming in COBOL for two posts within the Administrative Data Processing Group of the Computing Service. Duties will relate to the transfer to the University's new ICL 2976 computer of existing suites of programs and to the development of new programs to take advantage of the facilities of the new machine.

Appointments will be made at the grade of Programming Assistant, or Senior Programming Assistant I, with initial placement dependent on age, qualifications and experience. The salary scales for these grades, which are currently under review, range from £2370 to £3114 and from £2856 to £3816, respectively, per annum.

Applications, which should include the names and addresses of two persons to whom reference may be made, should be addressed to Dr G K S Browning, Director of Computing Services, The University of Glasgow, Glasgow G12 8QQ, from whom further particulars can be obtained. Applications should arrive not later than 22nd September, 1978 and all correspondence should quote Reference Number 4242P.

Re-advertisement
SUNDERLAND POLYTECHNIC
FACULTY OF SCIENCE
Department of Mathematics and Computer Studies

SENIOR LECTURER IN COMPUTER STUDIES (SYSTEMS ANALYSIS AND DESIGN)

Applicants should be graduates, or possess equivalent professional qualifications, and should have recent practical experience outside the field of education.

The successful applicant will have a senior role in a small team responsible for courses up to honours degree level in Data Processing.

Salary scale Senior Lecturer Grade £6,051 - £7,066 Bar - £7,572.

An application form and further particulars may be obtained from the Personnel Officer, Sunderland Polytechnic, Chester Road, Sunderland, SR1 3SD, and should be returned as soon as possible.

SYSTEMS ANALYST
DUBLIN - £6-7000

THE COMPANY one of Ireland's long-established and most progressive manufacturing industries based on the outskirts of South Dublin.

THE D.P. DEPT. is a small and friendly unit having recently upgraded its hardware to an ICL 2904 utilising JCL and plans to install T.P. in the early part of next year.

THE APPOINTMENT requires an Analyst who is competent in all aspects of analysis as well as being able to supervise a small team and deputise for the Data Processing Manager in his absence.

This is an excellent opportunity to join the team at an extremely interesting stage of development, allowing the selected candidate to broaden and contribute his or her skills within a rapidly changing environment.

For further details please quote C.W.206.

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SPECIALISTS IN DP AND EXECUTIVE RECRUITMENT

PARIS
SYSTEMS ENGINEERS— OS/MVS/VM
Circa £12,000 per annum — plus relocation expenses

We are seeking to identify well-qualified candidates to fill the above positions.

You will ideally possess up to three years' sound experience from working within an OS/MVS/VM environment involving Systems Generation and the design and writing of Software Utilities.

It is expected that you will be well qualified academically — preferably with a degree.

You will be called upon to act in a consultancy role, guiding and advising clients in the use of this software and it will therefore be desirable, although not essential, for you to be fluent in the French language.

WEST GERMANY
PROJECT LEADERS/ANALYST PROGRAMMERS
Salary range £12,000-£16,000 p.a. — plus relocation expenses

OUTSTANDING OPPORTUNITIES FOR YOU TO WORK ON THE DEVELOPMENT OF NEW MINI SOFTWARE AND PRODUCTION CONTROL SYSTEMS

PROJECT LEADERS:
We are looking for candidates who possess a sound Systems background gained from designing and implementing Production Control Applications.
Preference will be given to applicants who have worked in these areas designing systems for mini computer hardware such as PDP11, Siemens 330 or Philips P800. The ability to speak German is highly desirable.

ANALYST PROGRAMMERS:
Experience in writing and developing operations software for mini computer hardware essential.
Assembler programming experience or equivalent type low level language important.
Any experience of Communications Software will prove valuable.

OUR CLIENTS ARE PART OF A MAJOR EUROPEAN GROUP AND PROVIDE A WIDE RANGE OF PROFESSIONAL SERVICES TO THEIR CLIENTS THROUGHOUT EUROPE. THESE ARE PERMANENT APPOINTMENTS OFFERING SUCCESSFUL CANDIDATES THE OPPORTUNITY TO GAIN VALUABLE EXPERIENCE AND TO PROGRESS THEIR CAREERS WITHIN A VERY DYNAMIC AND PROGRESSIVE ENVIRONMENT.

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ABRAXAS West End House 11 Hills Place London W1R 1AG **01-439 8891**

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Skilled OS/VS1 OPERATIONS staff at all levels are in great demand at present. Companies are offering highly competitive salaries with an ever increasing number of fringe benefits. Jobs include both DAYS ONLY and shift working positions. Opportunities in all areas including TECHNICAL SUPPORT, DATA CONTROL and OPERATIONS. Listed below are some of the current requirements.

Please ring NOW for further details:

C. LONDON	OP.	1 YR. +	£4,000+
KENT	OP.	10 MTHS. 2 SHIFT	TO £4,200
MIDDLESEX	OP.	1 YR. +	TO £4,350
SURREY	OP.	1 YR. +	£3,800
MIDDLESEX	OP.	1 YR. +	£4,100

J/GEN

ICL 1900/2900
RETRAINING OPPORTUNITIES!

If you have at least 8 months' OPERATING *experience* on any ICL MACHINES, we may well have a position that will interest you. Our clients often assist with any relocation necessary and in many cases Upgrading from 1900-2900 offers excellent training opportunities.

Below are just some of the many vacancies, perhaps one of these may suit? If not — contact JASMINE DAINES for more information.

MIDDX.	OPS. 6II	2 YRS. +	TO £4,700
HERTS	OPS. 6II	2 YRS. +	C £4,000
MIDDX	OP. 6II	1 YR. +	TO £4,000
LONDON	OPS. 6III	1 YR. +	C £3,000
BERKS	SENIOR OPS.	ANY ICL	£4,300

J/GEN

DOS/VS
JOBS IN ALL AREAS!

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If you are considering a move, please contact us for details of positions in your area.

HERTS	SHIFT LDR.		£4,700
MIDDX	SENIOR OP.	2 SHIFT	TO £4,000
S. LONDON	OPS.	1 YR. +	C £4,000
HERTS	OP.	2 SHIFT	TO £4,300
C. LONDON	OP.	2 SHIFT	TO £4,000
KENT	OP.	1 YR. +	C £4,000
HERTS	SUPERVISOR		C £6,000

J/GEN

BURROUGHS — C £4,600

SURREY SENIOR OPS. and OPS required for well-established configuration undergoing systems modification which has created openings for experienced Operators who wish to further their experience. Excellent working conditions and staff benefits. M/GEN

PDP/DEC — C £4,500

C. LONDON. OPERATORS required with or without PDP/DEC experience for Merchant Bank currently running PDP11/70 x 2. At least one year's experience on ANY MAINFRAME will suffice. M/GEN

NCR — £4,000 +

C. LONDON. OPERATORS/SNRS. required for various positions in and around London. Minimum of 6 months' experience on NCR machines required. M/GEN

FOR VACANCIES IN YOUR AREA PLEASE RING ABRAXAS NOW

Abraxas Computer Employment Ltd.

Sales Bit and Hex Kid have been held over because of pressure on space

Computing Staff

LONDON SE1

The Computing Branch provides general computing services and facilities to administrative departments, research staff and Power Stations in South East England. We now require.

PROGRAMMER

For work on an ICL 1903T computer, operating under GEORGE 3 on systems for accountancy, stores control, purchase ordering and power station maintenance scheduling. At least one year's practical experience of COBOL required and knowledge of FORTRAN would be an advantage.

Salary within a scale rising from £4194 to £6735 per annum according to qualifications and experience.
Vacancy Number 1389/78/CW

SYSTEM SUPPORT ASSISTANT

To join the team that provides support services for remote users on a variety of terminals connected to the ICL 1903T. The work will include maintaining data communications software, system software, compilers, packages and utilities. Applicants should have had experience with data communications systems and operating systems and programming experience would be an advantage.

Salary within a scale rising from £4840 to £6650 per annum according to qualifications and experience.
Vacancy Number 1391/78/CW

The minimum qualification for both posts is 'A' level mathematics and a degree or professional qualification would be preferred. Appropriate subjects would be computing science, mathematics, physics, economics, electrical/electronic engineering.

Applications quoting the relevant vacancy number giving full details should be forwarded to the Personnel Officer (Recruitment), Central Electricity Generating Board, Bankside House, Sumner Street, London SE1 9JU to arrive by 25 September 1978.

South Eastern Region

Next week Yorkshire will be in Manchester

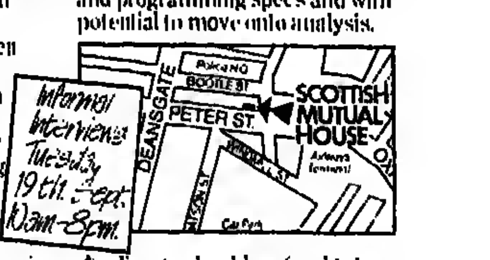
We are Yorkshire Imperial Metals Limited and next Tuesday we want to meet you in the centre of Manchester at the Manchester Interviewing Centre, 1st floor, Scottish Mutual House, 35, Peter Street, and on the 5th October we will be in London. We'll be there any time between 10am and 8pm, so just come in and find why we have so much to offer.

We have recently changed our hardware to a 370/148 running under OS/VS1 and supporting CICS and DL/1 and currently need the following people.

SYSTEMS ANALYSTS
With around 5/6 years experience and a detailed knowledge of hardware and software to investigate new techniques.

SENIOR PROGRAMMERS
With and around 4/5 years experience and a thorough knowledge of programming to handle large and sophisticated programme suites.

SYSTEMS DESIGNERS
With about 3 years D.P. experience to develop system and programming specs and with potential to move onto analysis.



Applicants should preferably be graduates or have a relevant professional qualification.

We can offer salaries of around £5K–£6½K, many benefits and exceptional prospects within the company, part of a major British Group. We will also give generous relocation expenses.

Spare a few minutes next Tuesday and call in. If you can't make it, phone us on Leeds (0532) 701107, Ext. 424, or write to Senior Appointments Officer, Yorkshire Imperial Metals Limited, P.O. Box 166, Leeds, LS1 1RD.

YORKSHIRE IMPERIAL — an IMI company

SENIOR PROGRAMMER

Salary up to £7,230 per annum

CAN YOU HANDLE AN ON-LINE SYSTEM?

Thames Valley Police are looking for an experienced Senior Programmer to perform development and maintenance work on a computer on-line system. A challenging series of extensions to this system and to associated IDS batch programmes is envisaged.

The successful applicant will have extensive COBOL experience on an on-line system, preferably but not exclusively with Honeywell 6000/level 66 using IDS & TOS. He/she must be willing to take an increasing interest in the maintenance of existing software and be capable of working to rigid standards. He/she will also have the ability to communicate at all levels.

Over 5 weeks' holiday, pension scheme, assistance towards removal expenses.

Application form and further particulars from: The Principal Personnel Officer, Thames Valley Police Headquarters, Kidlington, Oxford OX5 2NX (Tel. Kidlington 4343 ext. 267).

SYSTEMS ENGINEERS

Preferably with mini experience for a large computer manufacturer. Salary £8,000.

Telephone: Manhattan 01-531 9131, ask for Jim Taylor.

INDIA

SOFTWARE MANAGER and MARKETING MANAGER

A prominent Indian manufacturing company has recently formed a new division to build and distribute on a world-wide basis an advanced commercial microcomputer.

These opportunities offering excellent salary and fringe benefits are open only to Indian Nationals.

Applicants should telephone Mrs. D. Stanley on Byfleet 49511 or Byfleet 49618 to arrange an early interview.

OPERATORS

COMPUVAC

IBM OPERATORS

£4,000 ... Oil Company is looking for someone with around 18 months' ... experience who would like the opportunity to move into Operations Support.

£4250 ... This industrial organisation in South London is seeking an operator with ... experience of OS. There is a planned career path to Programming ...

I.C.L. OPERATORS
UP TO £4,700

We have many clients in the London, Surrey, Essex and Middlesex area who urgently need operators at all levels ... George 3 ... ICL NEW RANGE equipment and excellent opportunities ...

DAYS ONLY POSITIONS

If you are currently looking to get off shifts any of the following will interest you:

- IBM DOS VS POWER with good JCL ... Operations Support job with this expanding installation £5,000.
- 2 years IBM OS or MVS ... Network Controller ... £5,000.
- Good IBM OS JCL is required for this Operations Support job £6,000.
- 1 year on System 3 ... RPGII ... Petrochemical company ... £4,500.
- 12 months IBM DOS POWER ... West London Pharmaceutical ... £5,700.
- Any disc based experience ... South London ... £3,700.
- We have many jobs for junior operators with six months' plus experience with salaries being offered up to £3,500 all shift.

Call now and speak to ex-operators who know the game.

24 hours answerphone

01 248 6367

COUNTY OF CLEVELAND
COMPUTER SERVICES UNIT

PROGRAMMER/ANALYSTS

(Up to £5,073) (includes supplement)

The unit wishes to recruit one or two people to ... existing programmer/analyst staff engaged on the development, implementation and maintenance of large scale computer systems, both batch and on-line, using some of today's most sophisticated equipment including twin CPU's.

An attractive career structure is in operation which allows for progression according to the complexity of work and responsibility undertaken.

Starting salary will depend on qualification and experience in an IBM OS/VS installation although thorough training will be given to candidates keen to enhance their job satisfaction.

Application forms from the Director of Computer Services, 5th Floor, Redo House, 67 Corporation Road, Middlesbrough, Cleveland (Telephone 0642 248155, Ext. 2361) to whom completed forms should be returned by 2nd October, 1978.

NATIONAL INSTITUTE OF AGRICULTURAL BOTANY

(a) SYSTEMS ANALYST/PROGRAMMER
(Ref. SV/318/C)

required for detailed work to an agreed schedule on feasibility studies, systems analysis and design, and for the supervision and execution of program writing and testing. Some statistical knowledge necessary. A degree or equivalent qualification in computer science is required together with at least two years' post-graduate experience of FORTRAN.

Salary on the Higher Scientific Officer scale £4101 to £5446 per annum

(b) STATISTICAL COMPUTER PROGRAMMER
(Ref. SV/324/C)

required to use special suites of Fortran programs for the statistical analysis and report preparation needed for crop variety trials data. HNC or equivalent qualification in computer science required together with at least two years' experience of FORTRAN programming and documentation.

Salary on Scientific Officer scale £2839 to £4415 per annum.

Application form and further particulars from the Establishments Officer, NIAB, Huntingdon Road, Cambridge, CB3 0LE. Telephone Cambridge (0223) 76381 ext. 234, quoting the reference number.

Closing date for completed applications ... October 1978.

COURSES

The Polytechnic Wolverhampton

BSc Computer Science (Part-time)

Part-time day and evening study.

For details contact: Dept. of Computing and Mathematical Sciences, The Polytechnic, Wolverhampton WV1 1LY. Tel.: (0902) 27371/2 Ext. 167.

Puzzle answer

ALL factorials greater than ... share multiples of ... A digital root ... only ...

Our client, who is a big name in the Construction Business, require PROGRAMMERS AND ANALYSTS/PROGRAMMERS for their D.P. Department in New Malden, Surrey.

The installation, an NCR 75, uses both Neat/3 and Cobol. Development is in progress on an interactive on-line communications system, written in Cobol with Neat/3 being phased out.

Programmers are required with 18 months' experience of Cobol on any machine, or Neat/3 people who would like the opportunity of retraining. Analysts are required to have at least 1-2 years' involvement in Analysis work.

Salaries for programmers are negotiable around £5000 and £6000 for Analysts with the usual big company benefits.
Ref CW/37/1

ONE OF THE UK'S LEADING SYSTEMS AND SOFTWARE HOUSES needs more staff for its Industrial division centred at Manchester.

Ideally you should have experience of Industrial applications in a manufacturing or process plant environment. A scientific or technical application background will also be of interest. Almost all work will be of a real-time nature on mini or micro computing equipment.

Salaries will range from £4.5k to £7k depending on experience.

This is an excellent opportunity for people who wish to join a small but expanding group of professionals working on the building of advanced and often complex computer control systems for both UK and overseas users.
Ref CW/37/2

Small Business Systems

ASSEMBLER

A major international Systems House who are better known for their mainframe work, have a fast expanding Small Business Systems Division.

They have an urgent need to recruit people who range from Programmers with 2-3 years' experience, through to Senior Project Leaders.

All you need is experience of ASSEMBLER on any machine, but if you have experience of SYSTEMS DESIGN, REAL-TIME ORDER ENTRY, or ORDER PROCESSING so much the better. Projects are all based on Real-Time APPLICATIONS on the ICL SYSTEM 10 and SINGER 1500 hardware.

Project teams usually consist of 2-3 people, allowing you to follow the project from specification through to implementation.

Salaries are well above market rate and the company can offer excellent career opportunities, Annual Bonus, plus usual Company Benefits one would expect from a company of this size.
Ref CW/37/3

Production Controller Software Developer

Germany

A unique opportunity has arisen, based in Germany, for experienced professionals to join a project team being formed to improve an existing operating system and develop a Production Control Package.

The ideal experience may come from a variety of backgrounds in software development or production control, but will probably include some of the following

Operating Systems, Interpreters, T.P. Monitors, File Handling, Database Techniques, Utilities and obviously Real Time Production Control on Minis.

Candidates with Production Control experience must be able to understand the requirements needed and specify the necessary solutions.

Ability to speak German would be useful but will not be a stumbling block. Relocation expenses will be paid to the successful candidates.
Ref CW/37/4

Systems Programmers

Our client, an international manufacturer, has a need for Systems Programmers with IBM, ICL or DEC hardware experience. You should be conversant with more than one major hardware and software system. You should also be capable of understanding the characteristics of complex software. Your work will include

- ★ Evaluating software packages
- ★ Testing out software facilities and performance
- ★ Writing middleware and basic software products
- ★ Advising and supporting application programmers

Therefore, we would like to hear from Systems Programmers with at least 2 years' experience who would like the opportunity of being involved on more than one operating system and more than one piece of hardware. Attractive salaries will be paid to the successful candidates.
Ref CW/37/5

PDP/11 / Macro Assembler

Middlesex & European Travel

Our client, based in Middlesex, is involved in a specialist area of the OEM market. We wish to recruit on their behalf a competent programmer to join their small but specialised European sales support group.

Working in a highly sophisticated environment, the successful candidate will be required to take responsibility for supporting salesmen in creating new software for user needs on DEC PDP11/D4o in addition to adapting and developing software to drive their equipment of various mainframes.

This is an excellent opportunity for someone with the necessary skills to expand themselves in an unusual but stimulating job. A fair amount of short term European travel will be involved. Also, in addition to salary benefits etc. a car package will be negotiated for exceptional candidates.
Ref CW/37/6

Micro Engineers

Up to £7,...

An International Systems House, who have offices throughout England and Western Europe, need ENGINEERS for their Micro Division.

The roles are varied but could include.

- ★ Evaluating
- ★ Commissioning
- ★ Interfacing the latest American Boards
- ★ Assessing client needs
- ★ Producing sales aids
- ★ Training Micro users

Their benefits include 4 weeks' holidays, staff mortgage service, group health insurance and regular salary and promotional reviews. Removal assistance is available where appropriate.
Ref CW/37/7

Neat/3 Programmer

West London

A small but expanding DP department within a group of private companies requires a PROGRAMMER with at least 18 months' experience of NEAT/3 to help them in their planned expansion program.

The Installation, an NCR 75 running under B1 Batch, is soon to be Upgraded with the Introduction of Real-time applications, thus necessitating the change to COBOL as a programming language.

Therefore we would like to hear from Programmers who would like the opportunity of being retrained in Cobol but staying with NCR hardware.

Situated in West London in new modern offices this company can offer excellent career prospects with the usual company benefits.
Ref CW/37/9

Programmers & Analysts

£4.5K - £8K

Consider the benefits of

- ★ Working in West London
- ★ Working on communications systems.
- ★ Progression to project leadership
- ★ Variety of job contact
- ★ Programme development through VDU's

If you are a Programmer or an Analyst and have had exposure to commercial applications (on any hardware), our client would be very interested to learn more about you and discuss your future. They are a well-established software house and offer a career path based on real time earning above average salaries and large company benefits.

Projects are divided into small teams and there are many opportunities for men and women with management potential to gain experience in project leadership at every early stage.
Ref CW/37/8

Central Computing Consultants

KINGSTON: 44 Wood Street, Kingston upon Thames, Surrey, England. Telephone 01-549 3212. Telex 27950
DUBLIN: Canberra House, 24 Lower Leeson Street, Dublin 2. Telephone 789577 (5 Lines)
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